Global Journal of Business Research

VOLUME 6 NUMBER 2 2012

CONTENTS

EVIDENCE ON THE IMPACT OF THE "SUSU" SCHEME IN GHANA

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ABSTRACT

The study explores the impact of the "susu" scheme, an informal banking mechanism for daily or weekly collection of deposits prevalent on the West African markets, on small businesses in Ghana. Evidence gathered from the analysis of a randomly-drawn sample size of 1,600 small business owner contributors indicates that their average daily/weekly contribution to the scheme is three Ghana cedis (approximately two US dollars) and that majority of them have seen its positive impact on their businesses. Binomial logistic regression analysis results support the contention that the number of years of contribution, the number of years in business, marital status, the number of dependants, gender and the amount contributed daily or weekly are predictors of the positive impact of the "susu" scheme on the business of its contributor.

JEL: G20, G21, G23

KEYWORDS: "Susu", Microfinance; Small business; Impact, Contributors, Ghana

INTRODUCTION

Access to finance has been one of the priorities on the agenda of policy makers worldwide. This is because without credit accessibility economic growth is stifled, culminating in the escalation of poverty with dire social consequences for an economy. Research using firm-level surveys has shown that improvements in the functioning of the formal financial sector abate financing constraints more for small firms (Beck, Demirgu¨c¸-Kunt, Laeven, and Maksimovic, 2006). Research also indicates that access to finance promotes more start-ups (Klapper, Laeven and Rajan, 2006). Improved access to the financial system also enables existing firms to attain a larger equilibrium size by enabling them to take advantage of growth and investment opportunities (Beck, Demirgu¨c¸-Kunt, Laeven, and Maksimovic, 2006).

Making credit available to small business entrepreneurs who are mostly poor for productive economic activities requires the role of formal financial institutions with commercial banks playing the pivotal role. However, over the years, commercial banks have shown a great deal of reluctance to serve the lower end of the economic spectrum-micro and small enterprises (Westley and Shaffer, 1999). It has long been argued that commercial banks have not provided for the credit needs of relatively poor people who cannot provide loan guarantees but who have feasible and promising investment ideas that can result in profitable ventures (Hollis and Sweetman, 1998).

The cumbersome features of formal financial institutions in the delivery of credit have led to the development and growth of a considerable number of microfinance institutions (MFIs). Microfinance is seen as the key innovation of the last 25 years in terms of means of reaching out to the poor and the vulnerable (Montgomery and Weis, 2006). The microfinance concept has emerged as a development tool aimed at providing credit and financial services to the productive poor who lack access to formal financial intermediation and are engaged in small and micro enterprises (Kyereboah-Coleman, 2007).

One of the innovations in microfinance aimed at helping the poor and financially excluded to cultivate the habit of saving and to have access to uncollateralized loans at affordable rates is the 'susu' scheme. "Susu" is seen as a major component of finance for urban poor entrepreneurs in Ghana, particularly apprentices and artisans (Alabi, Alabi and Ahiawodzi, 2007). According to the World Bank (1994) "susu" is believed to be the poor and financially excluded's sole source of getting established for livelihood. Owing to this significant role of the scheme now almost all rural banks, savings and loans companies and commercial banks in Ghana have created "susu" department often called microfinance department devoted to daily collection of small deposits from people who otherwise would not have access to the banks. This has made the "susu" scheme a popular tool for savings mobilization and financial management in Ghana. However, to the best knowledge of the authors, the question of whether or not in the opinion of its contributors, the scheme is making any positive impact on their businesses has not been adequately addressed in the microfinance literature. The only report available on this topic is one published by (Alabi, Alabi and Ahiawodzi, 2007) who studied the impact of the "susu" scheme on micro and small -scale enterprises using 101 organized and unorganized micro and small businesses. They used the number of employees employed and the turnover before and after the "susu" scheme as barometers to measure the impact of the scheme. Although their work provides some insights into the impact of the "susu' scheme on small businesses in Ghana, yet we are of the view that assessing the impact of the scheme from the perspective of its beneficiaries should offer a better understanding of how the scheme is promoting small businesses in Ghana. The current study, therefore, seeks to measure the impact of the "susu" scheme from the perspective of its contributors. The authors seek to find evidence to answer three main questions: (1) what is the average daily or weekly contribution of a "susu" contributor in Ghana? (2) Has the "susu" scheme positively impacted the businesses of its contributors? (3) Are there factors that predict the positive impact of the "susu" scheme on the businesses of its contributors?

The remainder of the paper is organized as follows. Section 2 reviews the relevant literature on the "susu" scheme and sets up hypotheses to be tested. Data collection, research methodology and empirical model are described in Section 3. Section 4 provides analysis and interpretations of the empirical findings and Section 5 concludes the paper.

LITERATURE REVIEW

"Susu" as one of the microfinance schemes in Ghana is thought to have originated from Nigeria and spread to Ghana in the early twentieth century (Asiama and Osei, 2007). It is an informal financial identification for daily or weekly collection of deposits which is prevalent on the West African markets (Alabi, Alabi and Ahiawodzi, 2007). In Ghana, for example, it is now common to find that large numbers of individual "susu" collectors have established offices (kiosks) at various points in cities and towns where their clients can actually walk in to make deposits and engage in other transactions (Aryeetey, 2008).

"Susu" can be described as a form of banking because it is a system of trading in money which involves regular and periodic collection of fixed amount of deposits that are made available to the owners after a specified period of time or when required or to borrowers within the scheme at a fee. Interest on deposits is almost non-existent (Aryeetey, 2008). Borrowing under the "susu" scheme does not require collateral; it relies on a guarantee system to reduce risks associated with 'clean lending' (Alabi, Alabi and Ahiawodzi, 2007). Lending is for short periods (Aryeetey, 2008). The essence of the "susu" scheme is to help contributors (who are mostly small business owners) to protect their daily earnings from competing claims and ensure working capital to restock supplies at the end of the month.

To provide customized service, most "susu" collectors begin mobilizing daily deposits around noon each day which provides the clients with an opportunity to transact business and earn some income before

saving. This strategy offers convenience for the rural and urban poor women whose income is too low to deposit large amounts of money with the formal banking institutions (World Bank Group, 1999).

In terms of collection of daily or weekly deposits, the scheme uses two main methods: independent/private (non-salaried) collectors and salaried/commissioned staff. Under the independent (non-salaried) collector's method, the collector undertakes daily door-to-door collection of agreed fixed amount from clients for a cycle, usually one month. In each cycle, the collector's reward for rendering this service is a day's deposit of each client. For example, if in each day a client contributes one Ghana cedi then at the end of the contribution cycle the collector will subtract one Ghana cedi (approximately US$ 0.67) from the contributor's total deposits as service fee. The major risk inherent in dealing with private collectors is possibility of the collectors absconding with contributions. However, evidence suggests that the private collectors have been found to be more aggressive in reaching out to more potential savers since their profit is contingent on the number and per capita daily contribution of their clients. Under the salaried/commissioned staff deposit collection, the collecting agents are full-time employees of the MFI who undertake the door-to-door collection for and on behalf of the MFI for basic salary. This is the practice at most banks (CHORD, 2000).

Basu, Blavy and Yulek (2004) identify four different types of "susu" institutions that have influenced the operations of MFIs in Ghana. These are "Susu" Collectors; "Susu" Associations; "Susu" Clubs and "Susu" Companies. The "Susu" Collectors offer a saving vehicle by collecting daily amounts voluntarily saved by their clients which they return at the end of the month, minus one day's amount as a commission. The "susu" associations are either (i) Rotating Savings and Credit Associations (ROSCAs), collecting savings from their members and allocating them to each member in turn, or (ii) Accumulating Associations, which allow regular contributions to be accumulated to cover the lump sum costs of such special future events as funerals. The "Susu" Clubs combine the modus operandi of "susu" collectors and "susu" associations operated by a single agent in which members commit to save a pre-defined amount over the medium-term (50 to 100-week cycles) and pay commissions on each payment and fees when they are advanced the targeted amount before the end of the cycle. The "Susu" Companies are more recent (late 1980s) and registered. In addition to savings collected using traditional "susu" collectors, "susu" companies provide loans after a minimum saving period.

The 'susu' scheme cuts across a wide range of socio-economic or occupational groups such as farmers, petty traders, artisans, food processors and salaried workers. For many petty traders, market women, apprentices and artisans, "susu" is alleged to be their trusted and reliable source of starting, sustaining and growing their businesses (Alabi, Alabi and Ahiawodzi, 2007). These groups are generally within the low income bracket and many of them are women (CHORD, 2000).

Johnston and Morduch (2008) find that low-income households often apply loans to household needs, including school fees, medical treatment, daily consumption needs, and social and holiday expenses. Female entrepreneurs tend to allocate a greater share of profits for family and child welfare, and that there is a strong relationship between female entrepreneurial activity and children's welfare (Kessey, 2005). Women have a predisposition to use profits to meet family needs rather than to reinvest (Downing, 1990; Clark, 1991). "Women have been shown to spend more of their income on their households; therefore, by helping women increase their incomes, you are improving the welfare of the whole family" (Cheston and Kuhn, 2002 p.9). This suggests that personal factors of "susu" contributors should correlate with the positive impact of "susu" interventions. The paper, therefore, includes the number of dependants, marital status, and gender of the contributor as predictors of the positive impact of the "susu' scheme on contributor's business. This leads to the following hypotheses:

> *H_1: Unmarried "susu" contributors should experience the positive impact of the "susu" scheme on their businesses*

$H_{2:}$ The number of dependents of "susu" contributor should be negatively related to the positive impact of "susu" on business
$H_{3:}$ Male "susu" contributors should experience the positive impact of "susu" on their businesses

The number of years a business has been in existence should influence the possible positive impact of the "susu" scheme because stage models of the firm theorists (Dodge and Robbins, 1992) argue that older firms will adopt a more professional management style, and more sophisticated control systems. It is, therefore, expected that contributors with more experience in business should be efficient and effective in the management of the proceeds from the "susu" scheme; hence, possible positive impact. This variable has also been used as a proxy for the time the firm may have known its customers and the firm's quality and reputation (Petersen and Rajan, 1997). It is expected that there will be a positive relationship between the age (AGE) of the contributor's business and the positive impact of the "susu" scheme. This leads us to this hypothesis:

$H_{4:}$ The number of years in business is positively associated with the positive impact of the "susu" scheme on business

It has already been stated that the "susu" scheme helps its contributors to protect their daily earnings from competing claims and ensure working capital to restock supplies at the end of the month. It is, therefore, reasonable to propose that the number of years of contribution, amount contributed and the ability to contribute everyday or every week should correlate with the positive impact of the "susu" on the contributor's business. This leads to the following hypotheses:

$H_{5:}$ The number of years of contribution should be positively correlated with the positive impact of "susu" on business
$H_{6:}$ Amount contributed should be positively related to the positive impact of "susu" on business
$H_{7:}$ Ability to contribute everyday or every week should be positively related to the positive impact of "susu" on business

DATA AND METHODOLOGY

Data for the study have been collected through a cross-sectional "susu" survey undertaken by the authors using questionnaire as the data collection instrument. The use of sample survey strategy offers some advantages: representativeness of the findings; ease of data standardization, aggregation and synthesis; and ability to cope with non-attribution problem (Montgomery, Debapriya and David, 1996). A sample size of 1,600 contributors has been used in the study. This sample has been chosen based on the ability to reach the "susu" contributors. The sampling procedure is simple random sampling in which "susu" contributors at various commercial centres in Ghana are interviewed at random. Market centers are places with a large density of enterprises, especially those operated by women (World Bank Group, 1999). The questionnaire is administered to respondents after they have indicated that they are "susu" contributors. The 'susu' scheme cuts across a wide range of socio-economic or occupational groups such as farmers, petty traders, artisans, food processors (CHORD, 2000). Thus, respondents in the survey are petty traders, artisans, food processors, retailers, and dealers.

In order to analyze the dichotomous variable of whether or not a "susu" contributor is likely to experience the positive impact of the "susu" scheme on his or her business, the appropriate econometric tool is a binomial logit model (Kim and Yoon, 2004). The following binomial logit model is, therefore, constructed to relate the probability of "susu" positive impact on business to explanatory factors: number of years of contribution (CONTYRS); number of years in business (YRSINBUS); marital status

(MSTATUS); number of dependants(NDEPENDANTS); amount contributed daily or weekly(AMTCONT); and gender (GENDER). Summarily, the model is expressed as:

$$\Pi_{jn} = F(X'_{jn}\beta), \quad (1)$$

Where Π_{jn} is the probability that *n*th "susu" contributor will experience the positive impact of the "susu" scheme on his or her business, X'_{jn} is a vector of explanatory variables, β is a vector of coefficients to be estimated, *F* represents the cumulative logistic distribution function. Expanding equation (1), the logistic regression equation becomes:

$$\Pi \text{ impact} = \alpha_{0+} \beta_1 CONTYRS + \beta_2 YRSINBUS + \beta_3 MSTATUS + \beta_4 NDEPENDANTS + \beta_5 AMTCONT + \beta_6 ABILITYCONT + \beta_7 GENDER_{+} \mu \quad (2)$$

Where
Π impact= probability of a "susu" contributor experiencing its positive impact on business
Bk= are unknown parameters to be estimated
μ= the stochastic error term

Description of the variables used in the study has been presented in Table 1 below:

Table 1: Description of Variables

Variable	Description
Dummy for impact: Dependent variable	=1: "Susu" contributors with positive impact on business; =0: otherwise
Dummy for ability to contribute everyday/week (ABILITYCON)	=1: Ability to contribute everyday/week; =0: otherwise
Dummy for gender (GENDER)	=1: Male; =0: Female
Dummy for marital status (MSTATUS)	=1: married; =0: Female
Number of dependants (NDEPENDANTS)	=Continuous variable
Years in Business (YRSINBUS)	=Continuous variable
Number of years of contribution (CONTYRS)	=Continuous variable
Amount of contribution (AMTCONT)	= Continuous variable

This table provides a description of the variables used in the study.

The impact of the "susu' scheme is measured from the perspective of the respondents. The respondents are asked to indicate whether or not in their opinion the scheme has made any positive impact on their businesses. Thus, positive impact or no positive impact is the predicted variable. Where a respondent indicates that the scheme has positively impacted his or her business, the value of "1" is assigned; otherwise "0" is assigned.

The independent variables are years of contribution (YRSCONT); years in business (YRSINBUS); marital status (MSTATUS); number of dependents (NDEPENDANTS); amount contributed (AMTCONT); and gender of respondents (GENDER). The variables MSTATUS, ABILITYCONT and GENDER are dummy variables. If a respondent is married "1" is assigned; otherwise "0" is assigned. If a respondent is able to contribute daily or weekly "1" is given; otherwise "0" is given. If a respondent is a male the value "1" is assigned; otherwise "0" is given.

EMPIRICAL RESULTS

The descriptive statistics of categorical and continuous data and the results of the logistic analysis have been presented in Tables 2, 3 and 4 respectively.

Table 2 displays the descriptive statistics of the categorical data. It shows that of the 1,600 respondents, 683 and 917 are male and female respectively; 898 are married whilst 702 are single; 947 are able to

contribute to the scheme every day or every week whilst 653 are unable to. Table 3 also shows the descriptive statistics of the continuous data. The average number of years of contribution is 3 years; the number of years in business is 7 years; average number of dependants is 2 and the average amount of contribution is GH¢3 (approximately US$ 2).

Table 2: Descriptive Statistics of Categorical Data

		Frequency
Gender of Respondents:	Male	683
	Female	917
Marital status:	Single	702
	Married	898
Ability to contribute	NO	653
everyday/weekly	Yes	947

This table provides the descriptive statistics of the categorical data

Table 3: Descriptive Statistics of Continuous Data

Variable	**Mean**	**Standard Deviation**
Number of Years of contribution	3 years	1.442
Number of years in business	7 years	6.231
Number of dependants	2 dependants	2.046
Amount contributed	GH¢3 (approximately US$2)	1.508

This table provides the descriptive statistics of the continuous data.

Table 4: Logistic Regression Analysis of Determinants of Positive Impact of "Susu" Scheme on Small Businesses in Ghana

Variable	B	Wald	Sig.	Exp(B)
CONTYRS	0.446	15.323	.000**	1.562
YRSINBUS	-0.068	9.598	.002**	.934
MSTATUS(1)	0.872	13.991	.000**	2.392
NDEPENDANTS	0.196	4.295	.038*	1.216
GENDER(1)	0.836	11.852	.001**	2.308
AMTCONT	0.512	25.599	.000**	1.669

*This table shows the results of the logistic regression equation: Π impact= α_0 + β_1CONTYRS + β_2YRSINBUS+ β_3MSTATUS+ β_4NDEPENDANTS+β_5AMTCONT+ β_6 ABILITYCONT+ β_7GENDER. The first figure in each cell is the regression coefficient. The second figure in each cell is the wald-statistic. ** and * indicate significance at the 1 and 5 percent levels respectively. The number of observations is 1,600. Notes: CONTYRS, number of years of contribution; YRSINBUS, number of years in business; MSTATUS (1), marital status of "susu" contributor (1=married); NDEPENDANTS, number of dependants of contributor; GENDER (1), gender of "susu" contributor (1=men); AMTCONT, amount contributed daily or weekly.*

Out of the 1,600 "susu" contributors who participate in the study, 1,539 representing 96.2% indicate that they have seen some positive impact of the "susu' scheme on their businesses. Only 61 representing 3.8% of the sample indicate that they have not seen any positive impact of the scheme on their businesses. This finding is significant in the sense that it underscores the importance of the "susu" scheme to the development of small businesses in Ghana. Over the years, the economic activities of the poor but economically productive small business owners in Ghana have been hampered by their lack of access to the formal financial institutions because of their prohibitive operating procedures. Specifically, collateral requirement that has been the fulcrum around which the lending wheels of formal financial institutions revolve has succeeded in warding off small business owners, bogging them down in the quagmire of mediocrity. It is, therefore, refreshing that these small business owners who have turned to the "susu" scheme as their best alternative have experienced its positive impact on their operations. Policy makers can, therefore, marshal their resources towards the operations of the "susu" scheme as it has the potential of not only inculcating in small business owners the habit of saving and financial management but also contributing immensely to poverty reduction and its concomitant ramifications for the Ghanaian economy. Streamlining the operations of the scheme, flushing out the unscrupulous collectors who

capitalize on the gullibility of poor small business owners mostly women, will engender confidence in the system, thereby attracting many small business owners to the scheme. This will culminate in improved access to finance which will promote more start-ups (Klapper, Laeven and Rajan 2006) and also enable existing firms to attain a larger equilibrium size by enabling them to take advantage of growth and investment opportunities (Beck, Demirgu¨c¸-Kunt, Laeven, and Maksimovic, 2006).

Table 4 reports the binary logistic analysis of the determinants of the positive impact of the "susu" scheme on small businesses. The predictive power of the model, measured by Cox & Snell R Square and Nagelkerke R Square, lies between 66% and 88%. Evidence in Table 4 supports the argument that married "susu" contributors are more likely to experience the positive impact of the scheme on their businesses than unmarried contributors. Therefore, hypothesis H_1 is rejected. Marriage involves a lot of financial obligations. Thus, inability of a couple to manage their finances well can plunge them in poverty with catastrophic consequences. Since the "susu" scheme offers the financially excluded the opportunity to save, the possible explanation of the positive relationship between the married respondents and the positive impact of the "susu" scheme is that married couples, especially those with children, are more prudent in their financial management and would ensure that their "susu" contributions are galvanized to support their business operations in order to sustain themselves.

The number of dependants of contributors appears to have a weak positive relationship with the propensity to see the positive impact of the "susu" scheme on business. In other words, an increase in the number of dependants of a contributor positively correlates with the propensity to experience the positive impact of the "susu" scheme on business. Therefore, hypothesis H_2 is rejected. The interpretation is that, all things being equal, most small business owners in Ghana who contribute to the "susu" scheme do not channel their contributions to fulfilling their domestic and social obligations. Instead, they use the funds to support their operations. This suggests that small business owners in Ghana who contribute to the "susu" scheme are able to draw a line of demarcation between their businesses and their domestic and social obligations. This finding is heartwarming because written on the tombs of many extinct small businesses is the canker of intermingling of personal funds and business funds (Yilmazer and Schrank, 2006).

Table 4 shows that male "susu" contributors (the predicted sex) are more likely to see the positive impact of "susu" on their operations than their female counterparts. Therefore, hypothesis H_3 is accepted. This implies that male contributors to the "susu" scheme are more likely to use their contributions to support their businesses than their female counterparts. This finding dovetails into the available evidence that female microfinance clients are more likely to spend their income on their families than to reinvest it in their businesses (Downing, 1990; Clark, 1991).

The number of years in business (AGE) has been found to be inversely related to the positive impact of the "susu" scheme on business. Thus, hypothesis H_4 is rejected. One possible interpretation is the theory of business life cycle. Firms that operate in declining industries should not experience any positive impact of the scheme on their operations. On the other hand, the inverse relationship between the number of years of contribution and the positive impact of "susu" on business could be interpreted in the light of stage models of the firm theory (Dodge and Robbins, 1992) which argues that older firms will adopt a more professional management style, and more sophisticated control systems. It is possible that as small businesses grow and find their bearings, the "susu" contributions of their owners are not for supporting their businesses but for meeting their domestic obligations. This last interpretation seems more likely than the first because female entrepreneurs, for example, have been found to have a predisposition to use profits to meet family needs rather than to reinvest (Downing, 1990; Clark, 1991). A strong and significant positive relationship has been found between the positive impact of the "susu" scheme on small business and the number of years of contribution, suggesting that the more time contributors contribute to the scheme the higher the likelihood that they will experience its positive impact on their

businesses. Therefore, hypothesis H_5 is accepted. This finding is in line with the conventional wisdom that the impact of any programme or policy is felt when it is practiced for some time. This suggests that small business owners in Ghana must be encouraged to maintain consistency in their contribution in order to experience the positive impact of the scheme on their business operations.

The amount contributed by a "susu" client positively relates to his or her likelihood of seeing the positive impact of the scheme on his or her business. Therefore, hypothesis is H_6 is accepted. This is understandable because the higher the amount a person contributes to the "susu" scheme the higher the savings he or she accumulates at the end of the contribution cycle. Small business owners who contribute more should accumulate huge working capital for their operations. Raising huge working capital opens up the business to a lot of opportunities for growth and innovation (Beck, Demirgu¨c¸-Kunt, Laeven, and Maksimovic, 2006). No association has been found between contributor's ability to contribute to the "susu" scheme daily or weekly and the propensity to experience its positive impact on contributor's business. Therefore, hypothesis H_7 is rejected. This implies that it is not possible for one to predict the probability of a "susu" contributor seeing the positive impact of the scheme on his or her business by whether or not he or she is able to contribute to the scheme daily or weekly.

CONCLUSION

The study seeks to find evidence to answer three main questions: (1) what is the average daily or weekly contribution of a "susu" contributor in Ghana? (2) Has the "susu" scheme positively impacted the businesses of its contributors? (3) Are there factors that predict the positive impact of the "susu" scheme on the businesses of contributors? The study has demonstrated that the average daily or weekly contribution of a "susu" contributor is three Ghana cedis (GH¢3). Evidence abounds from the study that many of the small business owners in Ghana who have signed up to the "susu" scheme have seen its positive impact on their businesses. The nature of the "susu" scheme makes it an ideal vehicle for deposit mobilization in an economy like Ghana where inflation has always been a headache for policy makers. The scheme has the potential to assist the Central Bank and the Government of Ghana in their interventions aimed at controlling inflation and empowering the poor and financially excluded in the economy. This, therefore, calls for some preponderant attention to be given to the scheme. Over the years, the canker of some "susu" collectors absconding with the contributions of contributors has been rampant and this has abated the enthusiasm and confidence of existing contributors and, to a very large extent, warded off potential contributors to the scheme.

The swift arrest, prosecution and retrieval of contributors' deposits from such unscrupulous "susu" collectors will rid the scheme of 'filth', regenerate interest, enthusiasm and confidence in, and attract more contributors to, the scheme which will lead to economic growth and development. In addition, strengthening institutions like Bank of Ghana and Ghana Cooperative "susu" Collectors Association (GCSCA) for effective monitoring and supervision of private "susu" operators will go a long to make the scheme much more efficacious and responsive to the needs and aspirations of its contributors. Intermittent workshops and seminars aimed at building the capacities of private "susu" operators, equipping them with best banking practices and effective financial management skills will enrich the potential of the "susu" scheme as the best vehicle for accomplishing financial inclusion in the Ghanaian economy. Furthermore, the Government of Ghana must show commitment towards the rigorous enforcement of the non-bank financial institutions law in order to ensure best practices in the "susu" scheme. For enterprise development and promotion much campaign is needed to sensitize owners of small businesses who have not signed up to the scheme to do so immediately. This will improve access to finance for their businesses which will contribute to economic growth and development.

Binomial logistic regression analysis results support the contention that the number of years of contribution, the number of years in business, marital status, the number of dependants, gender and the

amount contributed daily or weekly are predictors of the positive impact of the "susu" scheme on the business of its contributor. One policy implication of this finding is that "susu" operators must encourage their contributors to maintain consistency in their contributions for an appreciable time so that they can experience the positive impact of the scheme. Another implication is for "susu" operators to encourage their clients to contribute larger amounts to the scheme so that they can experience its greater positive impact on their business operations.

It is intellectually imperative to point out the notable weaknesses of this study. One obvious weakness is the possible respondent bias inherent in the responses to the questions posed to respondents. Another weakness is the inability of the study to measure the degree of impact of the "susu" scheme on the businesses of its contributors. Also, econometrically, measuring the impact of a scheme from the perspective of its subscribers may be too simplistic. Notwithstanding these weaknesses, the findings of the study, undoubtedly, expand the frontiers of the microfinance literature.

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RURAL TOURISM AND IT'S IMPACT ON SOCIO-ECONOMIC CONDITION: EVIDENCE FROM WEST BENGAL, INDIA

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ABSTRACT

This study explores rural tourism in West Bengal, India. Rural tourism promotes the local economy, socio-cultural changes and life style of the people residing around the tourist locations. This study explores the reasons foreign and domestic tourists visit this location for religious or recreational purposes. This tourism has created tremendous impact on the local economy, life style and socio-cultural changes among the rural people in and around this tourist destination. A pilot survey shows that rural tourism at this location improved civic amenities like communication, sanitations, transport facilities and standard of living for the people in general. This study assesses the impact of India's National Tourist Policy 2002 as promoted by Ministry of Tourism, Government of India, on this rural tourist location. Specifically in terms of economic growth, employment potential, livelihood and changes in life style of the local people.

JEL: R11, E27

KEY WORDS: Rural Tourism, Non-urban livelihood, Socio-cultural pattern of life, income generation, Implementation of resources, ARMA Model, Economic Migrants.

INTRODUCTION

Tourism is likely to be a growing industry in India for some time. It has tremendous potential due to peoples' interest in travel and desire to explore nature and religious sites. Tourism in India is expected to play a key role in the country's economic growth, human resource, culture, wealth of the country in terms of foreign exchange earnings, etc. Simultaneously, it has a direct bearing on local culture, socio-economic patterns of life, traditions, food habits, language, values and ethics of the local people due to frequent visits of national and international tourists to attractive tourist destinations. People visit tourist locations to have a flavor of pilgrimage, cultural heritage, and nature. Sometimes they simply wish to get away from the monotony of routine life. People not only rejuvenate from these visits but also directly contribute for the growth of the local economy through the hospitality industry, handicraft industry and secondary occupations including tourists guide, carriers, etc.

The World Travel and Tourism Council (WTTC), estimates in 2002 travel, tourism and related activities contributed about 11% to world's GDP. This industry is currently generates 7.8% of the total workforce. This percentage is expected to increase to 8.6% by 2012. As per WTTC report of 2002, Tourism is expected to create more than 255 million jobs, almost 10.7% of the total global workforce. Much of this employment potential will be concerned with rural tourism where unemployment and lack of occupation are key issues for the local people and a large number of people live below the poverty level. Rural tourism has been neglected in India for a variety of factors including lack of infrastructure, civic amenities, lack of publicity, and peoples' awareness and accessibility to tourist locations. As a result, tourists from the home country and overseas countries prefer to visit urban tourist sites. This results in

tourist congestion in urban, religious and historical sites. Simultaneously innumerable tourist sites remain unknown and unnoticed in the rural belts of the country.

This paper observes that a tourist site, once located in an extreme rural location has come to the limelight due to its historical importance or publicity by the local government and they have developed it into a tourist village with variety of improvements in civic amenities, road and rail connections, hospitality and cottage industries. This brings about immense change in the local economy including growth in the handicraft industry, employment, life style of the local population, etc. Examples of rural tourism converting a rural belt into urban area are Ajanta, Ellora, Goa, etc. in India. The paper is organized in the following manner: Literature Review, Data and Methodology, Results and concluding Comments.

LITERATURE REVIEW

According to Lewis, James B. (1998) et.al one of the most popular issues is rural community development is the use of tourism as a tool for development. There is a good deal of information about rural tourism including economic analysis of tourism, its impacts, and its effect on people. R.N. Kaul (1985) points out that "one of the reasons for travel has been the desire to widen one's knowledge and understanding about other peoples, place, and countries and study their culture, customs, ways of life and heritage and satisfies ones curiosity about them.

Rajeev Kumar (2008) rural tourism is a subset of tourism that consists of ranging aspect such as farm/agricultural tourism, cultural tourism, nature tourism, adventure tourism, and eco-tourism. Any form of tourism that displays the rural life, art, culture and heritage at rural locations, thereby benefiting the local community economically and socially as well as enabling interaction between the tourists and the locals for a more enriching tourism experience can be termed as rural tourism. Rural tourism is essentially an activity that takes place in the countryside. Rural tourism is essentially an activity that takes place in the countryside. Rural tourism creates experiences for tourist who enjoys locations that are sparsely populated, it is predominantly in natural environment, and it meshes with seasonality and local events and is based on preservation of culture, heritage and traditions. Rural tourism has become quite admired since the last few years.

According to Negi (1990) attractions in rural areas includes enjoyment of rural scenery, the desire for open space, quiet and peace of mind. Rural sports like hunting, fishing, ethnic attractions like folk life, custom, food, drinks, and festivals. Educational and historical attractions like castles, churches, temples etc. Respondents to an English Tourism Council research project on rural tourism described the concept of rural tourism as 'peace and quiet', 'slower pace of life', 'fresh air', 'non urbanized' and 'lots of space.' This research also stated that rural tourism could encompass 'gentle' countryside (farms, fields, and cows), 'rugged' countryside (moors, hills, and mountains), coastal areas and non-urbanized towns and villages. Vanhoe (1980) noticed, "Five most commonly occurring economic variables affecting tourism demand are income level, population, relative prices, and exchange rate and travel costs."

Briedenhann and Wickens argue the benefit of tourism results from an alternative development strategy for economic and social regeneration of rural areas, as a catalyst to stimulate economic growth, increased viability of underdeveloped regions and improve the standard of living of local communities. Hall and Jenkins (1998) suggest that the expansion of tourist flows in rural areas: To sustain and create local incomes, employment and growth, to contribute to the costs of providing economic and social infrastructure, to encourage the development of other industrial sectors, to contribute to local resident amenities and services. Also important is to contribute to the conservation of environmental and cultural resources.

Lane .B (1994) points out that "rural tourism should be –located at rural areas. Functionally rural i.e. small scale enterprises, open space; natural contact, heritage, traditional, societal practices etc; rural in scale; traditional in character; take different forms representing the complex pattern of rural environment, tourists share in village life, and rural villages gain economic and other benefits from tourist activities. According to the Annual Report of Ramakrishna Mission and Pallimangal Kamarpukur, 2006-2007, tourism is more labor intensive than other sectors. According to Chakraborty (2007), Tourism services can increase employment, but businesses may target skilled labor elsewhere rather than train local labor from amongst the poor. According to Singh (1994), the interest of tourism and heritage conservation is complementary and thus tourism and culture become partners in the developmental process.

DATA AND METHODOLOGY

This study is based on primary and secondary data. Observation and survey methods have also been used in conducting this research study. To fulfill the study objectives, observation method and survey method are the main technical tools. The survey instrument included questions on socio-economic aspects like age, sex, education and occupation. Information about the tourism industry profile includes the tourism units (i.e. hotel, guesthouse, etc.), number of rooms, number of persons employed, number of local workers as well as the profile of tourists. Rural Tourism Appraisal Model (RTAM) Philosophy was employed to evaluate the current situation using a SWOT analysis. The Sample size was restricted to 160 respondents and 60 respondents of four Stakeholders viz The RK Mission, Local Community, local Government, dedicated tourist pilgrims. The collected data is analyzed using different statistical methods like percentage and ARMA Model for future prediction of tourist inflow. Sources of secondary data collected were legal documents, official statistics, reports, articles, publications and other documents, reports of self-government bodies and organizations websites.

Context of Kamarpukur

Lord Sri Sri Ramakrishna (1836-1886) the great religious clairvoyant was born in Kamarpukur in the district of Hooghly in West Bengal, India. Swami Vivekananda the disciple of Sri Ramakrishna had spread the message of his Master in the country and beyond. He specifically communicated in western countries especially in the international congress religion at Chicago, USA . The site of Ramakrishna Mission Kamarpukur retains the mud house with thatched roof which is the holy birth place of Sri Ramakrishna. The center was affiliated with its Headquarters at Belur Math, Howrah India. This Holy Place turns into a pilgrimage as well as a tourist destination.

Kamarpukur is situated in the extreme West of Arambag Sub-division of Hooghly District, West Bengal in India with Bankura district in the West and Burdwan in the North. It is surrounded by three rivers: the Damodar, the Kansabati and the Darakeswar. Considering its geographical location and historical importance, Kamarpukur has taken a vital position in rural tourism in West Bengal. Although this tourist spot is of religious importance, it is a nature lovers' paradise. It is as if Garh Mandaran, Jilimili, Susunia and Mukutmanipur are located along the crow's flight from the tourists' main destination of Kamarpukur. In other words, the tourists visit Kamarpukur for religious purpose and thereafter cover the neighboring tourists locations in one outing.

As per the 2001 Census Report, Kamarpukur is spread over of 190.30 sq. kilometers with total population of 1,43,359 of which 54,380 people are from the backward community. Density of total population is 754 per sq. kilometers. Out of a 190.30-kilometer area 14.84 hectors are cultivable land. Therefore, the local population cannot solely depend upon agriculture as the primary source of income. Therefore, a large number of populations depend upon secondary sources of income through local tourism and handicraft industry catering to needs of the tourists.

The local population lives in a religious atmosphere and in cultural heritage of Ramakrishna, Sarada Devi and Swami Vivekananda. Local people largely depend upon two festivals viz. Ramakrishna's birthday, Durga festival celebrations when domestic tourists visit this site. In order to conserve rich cultural and spiritual heritage, Ramakrishna math undertakes activities like:

i) The cultural performance by village folk viz. folk dance, amateur theater, musical performance – these cultural performances not only entertains the local population but the domestic tourists who are interested to observe traditional village culture.

ii) Lectures and discussions are organized in nearby villages regarding harmony of religion and for promotion of international brotherhood and elevation of spirituality in the community.

iii) Fare at Kamarpukur establishes variety of temporary shops, which are run by the people from neighboring villages who display and sale local handicrafts.

Ramakrishna, Sarada Devi and Swami Vivekananda influence much of the cultural life of the local population during traditional Hindu festivals. The local population and international tourists visit Kamarpukur on these occasions not only to enjoy the religious activities in rural environment but also to have a taste of Cultural heritage of this tourist destination. This provides an opportunity to local people to display and sell their handiwork to the tourists to earning their livelihood. In order to accommodate the tourists for their stay at Kamarpukur, Ramakrishna Mission runs two guesthouses. There are private hotels and restaurants at Kamarpukur who take care of large number of tourists.

Because of seasonal tourism, local people earn more through supply of food, providing transport facility and selling their handiwork to the tourists. The villagers of Kamarpukur, opine the tourism industry is a lucrative source of income. During the festival of Sri Ramakrishna's birthday fair and during different festivals local individuals earn significant amounts of cash. Ramakrishna Math takes initiatives every year during those celebrations. Tourism can also support the local culture in rural areas by encouraging restoration of local and regional historic sites. In addition, tourism, generally considered a relatively clean industry, may foster local conservation.

RamaKrishna Mission possess two relatively big two guesthouses for Pilgrims who wishes to extend their spiritual holidays for a few days. For accommodations, individuals must contact the Math Authority for booking and reservations. There are three, four and five bedded rooms with or without attached baths. Some private lodge, hotels and restaurant are built nearby the math and around Kamarpukur. Wwhen overcrowd at the time of celebrations occurs, tourist stay such lodge cum hotels. One observable impact of tourism is the tea stall, fast-food center, rickshaw puller, STD shops, sweet shop owners benefit due to tourist inflow. As a result they are able to earn significant cash from tourists. At the time of Prayer Kamarpukur Mission authorities provide tourist police for maintaining discipline. Van Rickshaw, Rickshaw and rental cars are available for sightseeing. Medical facilities are available for emergenies.

There are other facilities like Medical aid, medicine shops, laundry facility, banking services and Travel agents available to fulfill tourists' needs. With regard to tourism, Kamarpukur faces two-fold problems. On one hand tourists visiting the area during two popular occasions do not get adequate accommodations. On the other hand, during the rest of the year due to lack of tourists, neither the Government, nor RK Mission nor private investors are interested in developing boarding, lodging and other infra-structural facilities at Kamarpukur. This tourist location, despite having high potential, remains neglected for most of the year. Second, compared to availability of limited agricultural land and high density of population at Kamarpukur, as enumerated earlier, the population cannot depend on agriculture alone. They need to explore their potential for handiwork, which has tremendous potential for growth if tourism is promoted and it becomes perennial in nature in this tourist location.

Table 1: Infrastructure at a Glance

Amenities	Kamarpukur (Nos.)
Guest House/Lodge	
a) Run by RK Mission	2
b) Private Entrepreneurs	8
Hotels	4
Food stalls	7
Car rental	20
Rickshaw	45
Van rickshaw	20
Handicraft shops	6
Tourist Police	10
Hospitals/Dispensary	1(Hospital)
Water supply tank	1
Shop outlet under Ram Krishna Mission	2
No. of Tourists	45,000 (approx) during season and 10,000(approx) during off season
Car parking facility	Constructed by RK Mission
Children's Park	1

Source: Field survey method

It will certainly improve socio-economic pattern of life of local people of Kamarpukur. Tourism can offer rural residents business opportunities in activities that cater to the tourist trade. Brown M. Dennis notes such locally operated businesses, which may be seasonal, can provide local residents with valuable opportunities to develop business skills and can give local crafters, farmers, and food processors, among others, outlets to sell their products to local retail establishments. Paralelly we observe that handicraft of Kamarpukur and neighboring villages are very rich. Gradually tourism activities are improving. Some rural development projects of "Ramakrishna Mission Pallimangal" are gathering momentum. The existing small-scale industries, which need to be nurtured through rural tourism, are outlined below.

Jute Handicraft Unit: Since 2001 -02, Jute handicraft units producing about 35 jute items for domestic usages have appeared in Pallimangal centre providing employment to 75 poor and destitute village women who earn in the range of Rs. 1000 – 1800 per month. Although the number of people and earnings are insignificant, they are worth mentioning due to the effort on the part of non-governmental agency i.e. Ramakrishna Mission.

Weaving Project Unit : Women workers at Kamarpukur are doing handloom weaving and stitching of garments. Ramakrishna Mission has opened at Nakunda under the Pallimangal Weaving Project. In 2010 the project provided job opportunities to 33 poor and destitute women who earn in the range of Rs. 1000 – 5000 per head per month.

Incense Stick Unit: In 1980, the Pallimangal centre promoted this cottage industry, which provides self-employment to about 30 persons who earn in the range of Rs. 1000–2300 per month each.

Mini jute Spinning Unit : The Unit was established during the year 1987 as a pilot project in collaboration with Jute Technological Research Laboratories (Now NIRJAFT) Dept of Science and Technology Governmentt of India and Govt of West Bengal. Average earning of a worker is Rs 1267.00. This unit was under taken by pallimangal during its inception in 1980.

Food Processing Unit: Promoting Cottage industries with available resources, minimizing wastage of perishable fruits and vegetables, is important to help the farming community. Pallimangal started the Program in June 2002. Currently 19 products are processed from different fruit and vegetables. The Government of India, Ministry of Food Processing Industries Sponsored 3rd EDP training on food processing during the year.

There are also units like Seed Production Units, Apiculture Unit and Solar Energy Units. The Community of Kamarpukur is well cultured and educated. Educational status in and around Kamarpukur is very rich. There is One Boy's School under R.K.M, One Girls' School, One Co-Ed. School and two Colleges under The University of Burdwan at Kamarpukur. There are also 13 Non-Formal Education Centers (NFEC) (Three Coaching Centers for Primary School Students) for SC, ST and Depressed Classes. Medical Service is rendered by the R.K.M for poor and needy patients of the local and neighboring villages of Bankura, Medinipur and Burdwan districts. Eye Core Unit and National Blindness Control Program, National Tuberculosis Control Program, National Leprosy and Elimination Prom, Child Nutrition Program (Average 36 Children per day were provided with milk powder, Biscuits, Sweets), Regular Mobile, Medical Services are free of cost since 1980 in and around Kamarpukur. More than 196 medicinal plants collected from different regions of the country are cultivated and has been named 'Gadadhar Herbal Resource Garden' established in 2005-2006 to make people aware of the importance of cultivation of medical plants for the use of domestic health remedy.

Table 2: Stakeholders

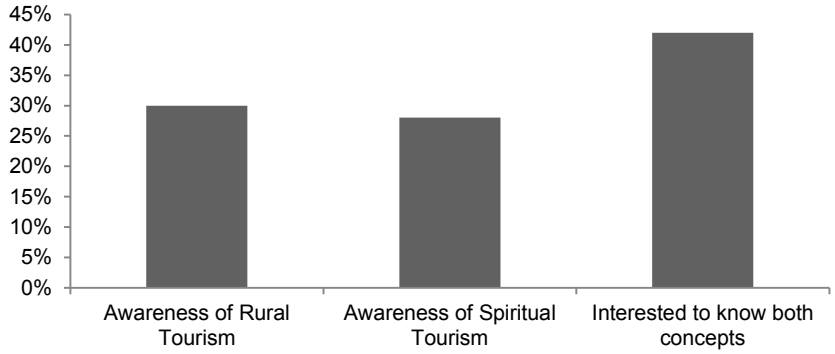
Classification of Stakeholders	What we can expect them to offer	Potential Influence	Description
The RK Mission	Human recourse, Organizing of funds Overseeing Activities	60 / 60	Their overall vision will drive the project
Local Community	Initial 'help' may be Minimal	37/60	Critical stakeholder - they stand to gain the maximum even if they cannot 'help', they have their ability to hinder
Local Government	They can play a crucial role in government sanctions	25/60	Their cooperation needed for safety and security; they can create issues if training programme not sustained long term
Tourist Pilgrims Dedicated tourists.	Regular , committed	48/60	Can be future source of sale of products; and encouraged to participate in community initiatives to create a 'corpus' of funds- for basic food and clothing.

The above table reveals about the Stakeholders operations at Kamarpukur for the upliftment of the socioeconomic development for the local people.60 respondents considered from each segments of stakeholders and their participations in community development .

RESULTS

From the above data, the following results clearly emerge. A survey conducted on 160 respondents ascertains the contribution of tourism to the economic growth of Kamarpukur. Some 160 respondents revealed their awareness of rural tourism and spiritual tourism showing that 30% were familiar with the concept of rural tourism, 28% with spiritual tourism and the remaining 42% showed a keen interest to learn about both**.** (Figure 1)

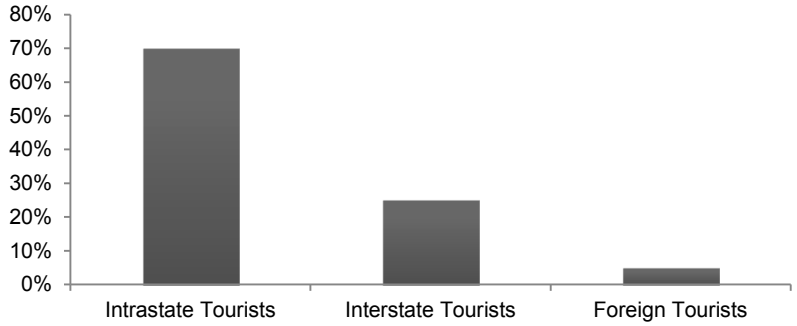
Figure 1: Awareness of Rural Tourism and Spiritual Tourism



This figure shows that Awareness of Rural Tourism and Spiritual Tourism Concept .Respondents those who are interested to know about rural tourism they agree that this kind of tourism may develop any rural or under develop region.

Figure 2 reveals that out of 160 respondents considered, 70% were intra state tourists, 25% were interstate tourists, and 5% foreign tourists. Majority of the 70% intra state tourists were from Kolkata, Howrah, Burdwan, Bankura, Midnapore, and 24 Parganas. With regard to the 25%, interstate tourists' majority came from Mumbai, Kerela, Chennai and Orissa.

Figure 2: Inflow of Tourists from Different Regions



This figure represents that Inflow of tourists from different regions in West Bengal as well as different parts of India and abroad.

Figure 3: Frequency of Visits

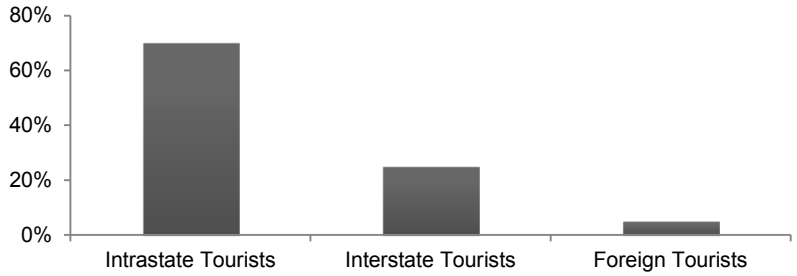


Figure 3 shows the frequency of visits at Kamarpukur**.** From 160 respondents in the study we find that 48% had visited Kamarpukur for the first time, 22% had visited twice in a year, while the remaining 30% visited only in the festive seasons such as Durga festival, Ramakrishna's birthday, and Kalpataru festival. The 160 respondents segmented on the criteria of the purpose of visit showed that 62% of retired persons visited for devotional purposes and for a pollution free environment; 26% to enjoy the rural environment and because such visits improved the economy and the remaining 12% indulged in casual visit.

Study on Stakeholders

A survey on possible community development with a sample size of 60 was conducted on four stakeholders, namely, Ramakrishna Mission, Local Community, Local Government, and Tourist Pilgrims. All 60 respondents surveyed at Ramakrishna Mission were involved in the effective utilization of rural human resource and organizing the available funds. Some 37 of 60 respondents in the local community showed a keen interest for direct involvement in community development. Out of the 60 respondents in the local government, 25 agreed to offer their full support to the safety and security of the community subject to government sanction of the requisite fund. Some 48 of 60 respondents of the tourist pilgrims were found to be regular dedicated visitors who directly participated in community building by rendering various services. For example, a doctor offered treatment to the sick while the teacher tutored. The community also economically benefits from the visits of these tourist pilgrims as the pilgrims indulge in lavish local purchases of the indigenous handicrafts.

EMPIRICAL STUDY

Using five years of tourist's inflow data, we analyze the future trend of tourist inflows in Kamarpukur. We apply a general time series regression model, which describes as:

$$Y_t = X_1\beta + \varepsilon_t \quad (1)$$

Where Y_t= tourist inflow**,** X_t = Year, ε_t= White noise, with zero mean and constant variance. We estimate the time series regression equations as follows:

Tourist Inflow

$$y_t = 4140.79 + 85.54x_t \quad (2)$$

Based on the above time series regression equation we predict the future trend of tourist inflow. This is a basic time series regression model. In order to avoid the problem of autoregressive and moving average we consider the ARMA (Autoregressive Moving Average) model for prediction of tourist inflow in Kamarpukur.

AR-model: $y_t = \rho y_{t-1} + \varepsilon_t$. It can be shown that :

$$E(y_t) = 0;\ V(y_t) = \frac{\sigma^2}{(1-\rho^2)};\quad corr(y_t, y_{t-k}) = \rho^k. \quad (3)$$

ARMA Model

$$y_t = \rho_1 y_{t-1} + \cdots + \rho_p y_{t-p} + \varepsilon_t \quad (4)$$

We estimate the ARMA model for tourist inflow, where we apply $p = 1$ and $q = 0$ based on partial autocorrelation functions. Here X_t is the value of time. The estimate ARMA equation as follows:

Tourist Inflow

$$y = 3140.79 + 82.54x_t + 0.43_{t-1} \quad (5)$$

Based on the Akaiki Information criteria and all t values for different regression parameters we conclude the model is accepted and is useful for predicting the future trend based on past data. Table 3 shows ARMA estimation of tourist inflow in Kamarpukur. Table 4 shows parameters of the ARMA estimation of tourist inflow in Kamarpukur.

Table 4 shows the ARMA estimation of tourism inflows in Kamarpukur. We accept the alternative hypothesis for each parameter based on t-statistics where the test statistics is described as follows: * t-statistic are significant at 1% level of significance i.e., t-values are more than 2.51 at 45degree of freedom and t-values are more than 2.50 at 45 degree of freedom. ** t- statistic are significant at 5% level of significance i.e., t-values are more than 1.96 at 45 degree of freedom and t-values are more than 1.96 at 45 degree of freedom. Figure 4 shows the partial autocorrelation function.

Table 3: ARMA Estimation of Tourist Inflow

Number of residuals	**48**		
Standard error	1430. 0396		
Log likelihood	-415. 45199		
AIC	836. 90398		
	Analysis of Variance:		
	DF	Adj. Sum of Squares	Residual Variance
Residuals	45	9,24,38,641. 2	20,45,013. 2

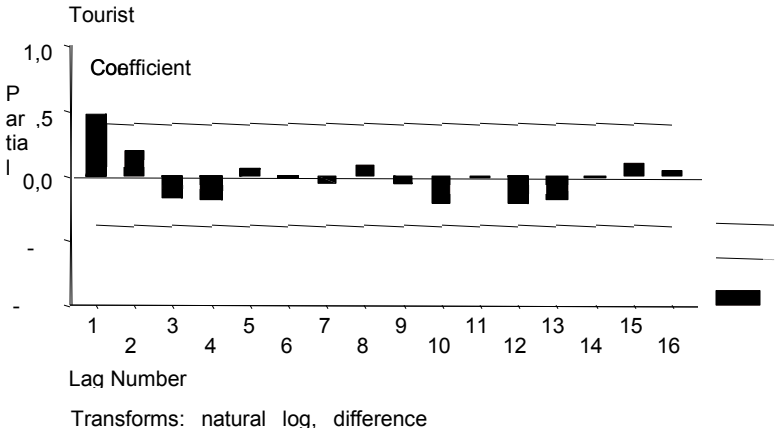
From the above table 3 we observed an Akaike information criterion which recommends accepting an ARMA (1,0) model in our analysis. If we consider the likelihood test statistics, it also suggests accepting ARMA (1,0). The first row shows the number of observations. First column of second row shows the standard error and second column of second row shows the value of standard error. First column of the third row estimates the value Log likelihood statistics and second column of third row show the values of estimated Log likelihood statistics. First column of the fourth row estimates the value AIC statistics and second column of fourth row show the values of estimated AIC statistics. Fifth row shows the value of analysis of variance. Second column of sixth row shows degrees of freedom, third column of sixth row shows adjusted sum of squares and fourth column of sixth row shows residual variance.

Table 4: ARMA Estimation of Tourist Inflow in Kamarpukur

Variables in the Model:				
	B	SEB	T-RATIO*	APPROX. PROB
AR1	0. 43980	0. 14818	2. 9681127	. 00478743
MONTH	82. 54851	25. 34438	3. 2570740	. 00214403
CONSTANT	3,140. 79088	719. 04335	4. 3680132	. 00007284

From table 4 we have a different test statistics for different parameters. Here all t-values are statistically significant at 5% level of significance. We accept the alternative hypothesis that all parameters are explained in our model significantly. The first column shows the variables included in the study. The second column shows parameters and the third column shows the standard error. The fourth column shows t-ratio and the fifth shows p-values.

Figure: 4 : Tourism Inflow



Figures 4 shows that partial autocorrelation functions of tourist inflow, where it has a one coefficient, which is out of the confidence limits that mean we consider one order auto regressive model for our analysis.

Table 5 and 6 show the actual and forecasted tourism arrivals respectively. The tables depict that tourist flow to the destination is increasing every year and is matching the actual number of tourist arrivals with a negligible difference, which we have already seen from the recent compiled tourist statistics of the year 2010. Where the actual tourist arrivals to Kamarpukur is 90,734 and projected tourist arrivals to Kamarpukur is 91,656 with a minimum error of 1.01%. Figure 5 shows the SWOT analysis for rural tourism in the area.

Table: 5: Tourists Arrival to Kamarpukur (Actual)

Year	No of Tourist Arrival	% Change
2006	48,714	-
2007	53,322	9.45
2008	59,454	11.49
2009	82,511	38.78
2010	90,734	9. 96

Source: Database from Ramakrishna Mission Authority . Table 5 reveals the actual tourist arrivals to Kamarpukur starting from the year 2006 onwards. The table also reveals that the tourist flow to the destination is increasing every year.

Table: 6: Tourists Arrival to Kamarpukur (Forecasted)

Year	No of Tourist Arrival	% Change
2010	91,656	-
2011	1,03,541	12.96
2012	1,15,427	11.47
2013	1,27,312	10.29
2014	1,39,199	9.33

Table no.6 reveals the expected tourist flow to Kamarpukur starting from the year 2010 onwards with the help of ARMA model and percentage change of tourists inflow at Kamarpukur

Figure 5: Rural Tourism Appraisal Model (RTAM) Philosophy (SWOT)

S= STRENGTHS

1.Rich and Spectacular rural physical setting for rural tourism
2.Rich quality of natural environment
3.Rich History, Heritage, Handicraft
4.Rich variety of festive occasion and celebration throughout the year
5.Maximum level of tourist satisfaction
6.Good transportation

W= WEAKNESSES

1. Kamarpukur is far from main Urban area
2. Most of the cultural ritual demolished
3. Lack of trained guide
4. Lack of promotional strategy
5. Low level of sanitation

O= OPPORTUNITIES

1. Increasing tourism allied activities
2.Motivate more alternative employment and income generation
3.Capturing floating tourist and increased number of stay
4. Attracting attention foreign tourists
5.Development of allied tourism direct involvement activities

T= THREATS

1. Saturation of local cultural heritage expose
2. Political disturbance
3. Migrate / Shift another profession
4. Increase land price

CONCLUDING COMMENTS

The social significance of heritage lies in its association with identity. It is fundamental in helping individuals and communities. In and around of Kamarpukur of Hooghly district the custodian of religious heritage sites constitutes a key elements in defining their Socio-cultural identity. Interest in cultural heritage emerged as a tourist attraction during the 1990's and became an important economic asset and a mechanism to preserve ethnicity. History and its tangible markers in the form of buildings, cemeteries, folk music, literature, culture has quietly survived at Kamarpukur for centuries. This study reveals that Kamarpukur has great prospects as a rural tourism destination as well as pilgrimage tourism. The interest of tourism and heritage conservation is complementary and thus tourism and culture become partners in the developmental process. It can be said that with rich traditions of religious tourism, India can emerge to be a promising destination for modern tourism.

In this paper, authors have collected data from different segments of society and gone though different statistical analyses like percentage analysis and general time series regression. For future prediction of tourists inflow, the authors applied an ARMA Model on the basis of actual tourists inflow which was collected from Ramakrishna Mission Authority. The above study signifies that the tourist flow in this destination is increasing each year and matches the actual number of tourist arrivals with a negligible difference.Seasonal tourists, lack of tourism knowledge, different pattern of languages and some individuals unwilling to provide information contribute limited data collection. However, the future research scope of this particular destination always exists in the context of Socio-economic life.

Auxiliary services are becoming more commercialized which will affect tourism. Rural tourism is gaining importance in Indian with its economic and social benefits. It is estimated that an additional revenue to the extent of Rs. 4, 300 crore can be generated through Rural tourism. Therefore, rural tourism will play a vital role in bridging the gap between Rural and Urban India by balancing urbanization and counter urbanization syndromes.

We argue that rural tourism in this part of West Bengal will pave the way for sustainable development with women empowerment. Rural tourism is expected to emerge as an important factor for sustainable human development including poverty alleviation, employment generation, environmental re-generation and development of remote areas and empowerment of women. This paper recommends that the government as well as private agencies including NGOs intending to promote rural tourism in the state of West Bengal, India can ensure sustainable economic development and positive social change in this particular destination.

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ECONOMIC GROWTH AND REDISTRIBUTION: EVIDENCE FROM DYNAMIC GAMES

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ABSTRACT

This work is based on a differential game proposed by Kelvin Lancaster. The game between two agents called workers and capitalists is based on the accumulation and redistribution of benefits among social classes concluding that cooperative outcomes outperform non-cooperative. This approach determines the optimum solution in a centralized economy as a non-cooperative game and cooperative Pareto solutions forced by the social planner. We compare the model solution in a decentralized economy, where rates economic growth are converging to a steady state and obtain high rates of inflation, and higher levels of consumption. Alternatively, the cooperative solution found between agents can be confirmed. A capitalist game continues to monitor the cooperative principle, in which the maximum benefit is obtained through cooperation.

JEL: C61, C71, C72, C73

KEYWORDS: Differential game, non-cooperative game and cooperative game

INTRODUCTION

Since the publication of the book of von Neumann and Morgenstern (1994) The Theory of Games and Behavior, many authors have relied on game theory to represent a vast range of dynamic conflict situations in the field of economic theory. We consider the work of Kelvin Lancaster (1973) as the first reference to the application of differential games to economic growth and redistribution in our modern economy. Lancaster made a differential game between two agents called workers and capitalists, based on the topics of accumulation and redistribution of benefits among social classes. He studied the classics such as Malthus, Ricardo and Marx, concluding that cooperative outcomes outperform non-cooperative.

The work of Lancaster, Hoel (1978) considered the utility function of players discounted consumption over time. On the other hand Pohjola (1983) compared the Nash solution found by Lancaster with the Stackelberg solution in open cycle. This article would be years later commented on by de Zeeuw (1992) showing that the solution found by Pohjola is not complete and that there are infinitely Stackleberg balances. Similarly, Soto and Ramos (1992), made the same comparison of results in a Stackelberg game solution, and a cooperative Pareto solution, modifying the model, where both players seek to maximize the present value of consumption, when the two updated at the same well, reaching the result that the cooperative solution is Pareto more efficient than the one found in Stackelberg solution.

Finally, we find the solutions of a differential game, with changes to the original approach of Lancaster. We compare the solutions found to the Nash and Paretian solution, under a centralized economy and solutions in a decentralized economy in an infinite time horizon, where two agents present value is discounted to their consumption at different rates. Then we study the dynamic behavior of the economic growth model proposed by modifying the golden rule posed by Ramsey (1928) to maximize the use of both agents over time constant and determining the value of redistribution that should be awarded in the economy for both agents.

The work is outlined as follows: Part two details the model, section three develops the model's economic growth under a centralized approach. Later in section four with a decentralized view. We finally draw some conclusions.

LITERATURE REVIEW

As noted by Matti Pohjola, in his brief collection of papers on differential games of capitalism (Pohjola, 1985) the first approach to the problem of distribution from the point of view of game theory was proposed by Phelps and Pollask (1968). These authors see economic growth and redistribution as an intergenerational conflict. Kelvin Lancaster (1973) was first to apply game theory, differential patterns of growth and redistribution. He formulated a differential game of two players considering accumulation and redistribution of benefits among social classes.

Lancaster (1973) divided society into two classes called workers and capitalists, who are the game players. While his terminology is perhaps outdated, the work remains valid. Assume a sector economy whose output at a certain instant can be consumed or added to existing capital stock. Lancaster's model is designed to calculate the Nash equilibrium in open cycle (which happens to also balance feedback) and compares them with the cooperative solution that is obtained when both players seek to jointly maximize the sum of consumption. As expected the results show competition produces a deadweight loss.

Several authors have continued the study of capitalism games, introducing new hypotheses and developing new versions of the original model of Lancaster. Michael Hoel (1978) considered the effect of utility functions of players discounted consumption over time, which makes the equation governing dynamics of the system nonlinear. Pohjola (1985) introduced an infinite horizon, nonlinear utility functions and a restriction of full employment.

Some studies have addressed ways to reduce the welfare loss due to the lack of cooperation between players. Pohjola (1983b) shows that allowing workers to bear some control over investment improves the welfare of both players. Buhl and Machaczek (1985) along these lines consider the implications for workers having ownership of capital. This reduces the possible inefficiency as the decisions of workers are less tied to the behavior of capitalists. Moreover Pohjola (1983a) compares the Nash solution found by Lancaster with the Stackelberg solution in open cycle. This item was discussed later by Aart de Zeeuw (1992) showing that the solution found by Pohjola is not complete and that there are infinite Stackelberg equilibrium, but the findings on consumption remain true.

Cooperative solutions have also been studied in this context. Comparing Lancaster to the Nash equilibrium is the limit of what he calls social welfare function, which is simply the sum of consumption of both players. Hoel (1978) does the same but considers the amount instead of the entire Pareto frontier of all possible payments.

Rincon (1994) and Soto (1994) considered a modified model in which capitalists control the supply of labor, in addition to investment, and where the production function is Cobb-Douglas type. Soto noted threat strategies are not efficient but are a perfect balance in the subgames. Seierstad (1993) defined trigger strategies and demonstrates two different types. In addition to being perfect for subgames, this result obtains payments more efficient than Nash. Here we describe a model of growth and redistribution, formalizing the dynamics of the system and the functions of paying players.

THE MODEL

Considered a closed economy, the production $Y(t)$; en in an instant of time *t* can be either consumed or intended for investment capital stock $K(t)$. In this sector economy are two social agents called "working consumers" and "consumer investors," we assume the production function takes the form proposed by Rebelo (1991): $Y(t) = f(K) = A \cdot K(t)$, where A is the technology parameter. Additionally, some assumptions are adopted from the model proposed by Ramsey (1928) namely the infinite life that pose individuals, this due to the existence of dynasties. Also, we note that the population grows at a rate "n" and there is no physical depreciation of capital or $Y(t)$ is the net rather than gross production.

At each instant of time "working consumers" can be controlled with a variable proportion of total output that is targeted towards consumption. Following González (1998) we assume that this variable is defined in an interval $[a,b] \subseteq [0,1]$. The consumption of workers will be denoted by $C_1(t)$ and is given by: $C_1(t) = \alpha(t) \cdot \theta \cdot f[K(t)]$, where " θ " is the marginal propensity to consume.

Consumers investors have at their disposal all the output not consumed by the working consumers. It is intended either for their own consumption or to reinvest in the economic system. With the variable $\beta(t) \in [c,d] \subseteq [0,1]$ control the proportion devoted to investment. The rest $C_2(t)$, their consumption is $C_2(t) = [1-\alpha(t)] \cdot [1-\beta(t)] \cdot \theta \cdot f[K(t)]$. Investment in this economy is given by the variation in the accumulation of capital stock. This leads to the following differential equation:

$$\dot{K}(t) = I(t) = [1-\alpha(t)] \cdot \beta(t) \cdot \theta \cdot f[K(t)] \qquad (1)$$

Players seek to maximize their utility over an infinite time horizon, unlike the model proposed by Lancaster (1973), Pohjola (1983), Hoel (1978), Soto and Fernandez (1992) and Gonzalez (1998) who work with infinite horizon. Following Hoel, the utility we identify with the consumer using a positive discount factor denoted as λ for "working consumers" and ψ to "consumers investors". Thus we have the payoff function for each of the players:

$$J_1 = \int_0^{+\infty} \alpha(t) \cdot \theta \cdot f[K(t)] e^{-\lambda t} \cdot dt \quad (2) \quad \text{and} \quad J_2 = \int_0^{+\infty} [1-\alpha(t)] \cdot [1-\beta(t)] \cdot \theta \cdot f[K(t)] e^{-\psi t} \cdot dt \qquad (3)$$

It only remains to establish a state of the capital stock at the initial instant:

$$K(0) = K_0 \qquad (4)$$

The game consists of finding for each player as a watchdog over time varying in [a,b] and [c,d] respectively for each player, so as to maximize (2) and (3) subject to system dynamics described by (1) as an initial condition given by (4).

IMPLICATIONS OF A CENTRALIZED ECONOMY

In this economy there is a benevolent social planner that seeks to maximize the welfare of society as measured by the level that they consume.

Non-cooperative Solution: Nash Equilibrium

The calculation of Nash equilibrium is the maximization of the objective functional measures seeking to maximize the payment of a player while the others are considered fixed. In this situation hamiltoneanos define two for each player respectively, so we have "working consumers"

$$H_1(t,K(t),\alpha(t),\beta(t),m_1(t)) = \alpha(t)\cdot\theta\cdot f\left[K(t)\right]\cdot e^{-\lambda t} + \\ + m_1(t)\left[\left[1-\alpha(t)\right]\cdot\beta(t)\cdot\theta\cdot f\left[K(t)\right]\right] \tag{5}$$

And "consumer's investors":

$$H_2(t,K(t),\alpha(t),\beta(t),m_2(t)) = \left[1-\alpha(t)\right]\cdot\left[1-\beta(t)\right]\cdot\theta\cdot f\left[K(t)\right]\cdot e^{-\psi t} + \\ + m_2(t)\left[\left[1-\alpha(t)\right]\cdot\beta(t)\cdot\theta\cdot f\left[K(t)\right]\right] \tag{6}$$

The solution of this optimal control problem is solved based on the principle of maximum Pontrygain, taking into account that $\dot{K}(t) = (1-\alpha(t))\beta(t)\theta f\left[K(t)\right]$ and $K(0) = K_0$; thus optimal controls are: $\left(\alpha^*(t) = b \text{ y } \beta^*(t) = c\right)$.

Being-variables problem are:

$$\begin{cases} m_1 = \dfrac{b\cdot\theta\cdot A\cdot e^{-\lambda t}}{\lambda - A\cdot\theta\cdot(1-b)\cdot c} + Q_1\cdot e^{-[A\cdot\theta\cdot(1-b)\cdot c]t} \\ m_2 = \dfrac{(1-c)\cdot(1-b)\cdot\theta\cdot A\cdot e^{-\psi t}}{\psi - A\cdot\theta\cdot(1-b)\cdot c} + Q_2\cdot e^{-[A\cdot\theta\cdot(1-b)\cdot c]t} \end{cases} \tag{7}$$

At time "$\vec{t}$" which is left to use the combination $\left(\alpha^*(t) = b \text{ y } \beta^*(t) = c\right)$, is one in which cease verified the optimality conditions of the pair of control. The solution is obtained by solving the "t" equations $e^{-\lambda t} = m_1(t)\beta(t)$ and $m_2(t) = e^{-\psi t}$. In which t_1 and t_2 are the respective solutions of the equations above, if they exist and are in the interval $[0,+\infty)$, otherwise, give zero. It is noteworthy that for the resolution of equations that will approximate the equations by Taylor's estate.

$$t_1 \approx \frac{A\cdot\theta\cdot(b\cdot(c^2 - c\cdot Q_1\cdot -1) - c\cdot(c-Q_1)) + \lambda\cdot(c-Q_1)}{A^2\cdot c^2\cdot Q_1\cdot\theta^2\cdot(b-1)^2 + A\cdot\theta\cdot\lambda\cdot(b\cdot(c^2 + c\cdot Q_1 - 1) - c\cdot(c+Q_1)) + c\cdot\lambda^2}$$

$$t_2 \approx \frac{A\cdot c\cdot\theta\cdot(b-1)\cdot(Q_2-1) - b\cdot\theta\cdot(c-1) + c\cdot\theta - Q_2\cdot\psi - r + \psi}{A^2\cdot c^2\cdot Q_2\cdot\theta^2\cdot(b-1)^2 - A\cdot c\cdot\theta\cdot\psi\cdot(b-1)\cdot(Q_2-1) + \psi\cdot(b\cdot\theta\cdot(c-1) + c\cdot\theta - \theta + \psi)}$$

For the value of optimal control pair, the value of the stock of capital in the economy will:

$$K(t) = K_0\cdot e^{[\theta\cdot A\cdot(1-b)\cdot c]t} \tag{8}$$

The Transversality Condition

Given the condition $\lim_{t\to\infty}(m_t \cdot k_t) = 0$, then replace the values of (7) and (8), to clear the values of the constants Q_1 and Q_2;

$$\lim_{t\to\infty}\left(\left[\frac{b\cdot\theta\cdot A\cdot e^{[\theta\cdot A\cdot(1-b)\cdot c-\lambda]t}}{\lambda - A\cdot\theta\cdot(1-b)\cdot c} + Q_1\right]\cdot[K_0\cdot]\right) = 0 \text{ And}$$

$$\lim_{t\to\infty}\left(\left[\frac{(1-c)\cdot(1-b)\cdot\theta\cdot A\cdot e^{[\theta\cdot A\cdot(1-b)\cdot c-\psi]t}}{\psi - A\cdot\theta\cdot(1-b)\cdot c} + Q_2\right]\cdot[K_0\cdot]\right) = 0$$

It is important to note, as a necessary condition that $[\theta A(1-b)c - \lambda] < 0$ and $[\theta A(1-b)c - \psi] < 0$, which requires that the value of Q_1 and Q_2, are zero.

Value of Redistribution

The value of redistribution that should continue throughout the time the two actors in this economic system, "consumers workers" and "consumers investors" should be the payoff function expressed in (2) and (3). Then the value to be redistributed in the economy for both agents in order to maximize their utility as expressed in its use shall be:

$$\begin{cases} J_1 = \dfrac{b\theta AK_0}{\lambda - \theta A(1-b)c} \\ \\ J_2 = \dfrac{(1-c)(1-b)\theta AK_0}{\psi - \theta A(1-b)c} \end{cases} \qquad (9)$$

Deriving the optimal objective function with respect to K_0, we obtain:

$$\begin{cases} \dfrac{\partial J_1}{\partial K_0} = \dfrac{b\theta A}{\lambda - \theta A(1-b)c} \\ \\ \dfrac{\partial J_2}{\partial K_0} = \dfrac{(1-c)(1-b)\theta A}{\psi - \theta A(1-b)c} \end{cases}$$

It can be seen in the previous derivative experts we give interpretations of the variable price Coester. The product $m_1 e^{\lambda t}$ measures approximately the total income increase optimal for player 1, by increasing the initial request on the stock of capital by one unit. Similarly, the product $m_2 e^{\psi t}$ measures the increase in optimal total profit of player 2, by increasing the initial request on the stock of capital in one unit.

Cooperative Solution: Pareto Optimal

Now we will find non-dominated elements of the set of all possible payments in the game described above. In which the social planner, implanted the cooperative state, for this we define a social welfare

function in which payments are in addition to giving players for J_1 and J_2, weighted according to their ability or power of decision:

$$\begin{aligned} &\text{Max.} \quad W = \lambda J_1 + (1-\lambda) J_2 \\ &\text{s.a. :} \\ &\quad \alpha(t) \in [a,b], \ \beta(t) \in [0,1] \quad \forall\, t \in [0,+\infty) \\ &\quad \dot{K}(t) = (1-\alpha(t))\,\beta(t)\,\theta\, f[K(t)] \\ &\quad K(0) = K_0 \end{aligned} \tag{8a}$$

Hamiltoneano then the optimal control problem is:

$$\begin{aligned} H(t, K(t), \alpha(t), \beta(t), m(t)) &= \left[\lambda\alpha(t)e^{-\delta t} + (1-\lambda)(1-\alpha(t))(1-\beta(t))e^{-\delta t}\right]\theta f[K(t)] \\ &\quad + m(t)(1-\alpha(t))\beta(t)\theta f[K(t)] \\ &= e^{-\delta t}\theta f[K(t)]\left\{\lambda\alpha(t) + \left[(1-\lambda)(1-\beta(t)) + m(t)e^{\delta t}\beta(t)\right](1-\alpha(t))\right\} \end{aligned} \tag{9b}$$

Plausible solutions in optimal control to be used highlight the possible combination of $(\alpha(t) = b, \beta(t) = 1)$ and $(\alpha(t) = b, \beta(t) = 0)$, which will be used as times to take the social planner, called for "Maximum accumulation" and "Maximum Consumption" respectively. Thus, the peak consumption period, is interpreted as the ideal period to stimulate the economy, while the maximum accumulation period is the period to be analyzed if it seeks to anticipate any crisis that affects the growth of the economy. For these two periods there, redistribution of consumption values for both agents, maximizing their use. Maximum consumption is:

$$\begin{cases} J_1 = \dfrac{b\theta A K_0}{\lambda} \\ J_2 = \dfrac{(1-b)\theta A K_0}{\varphi} \end{cases}$$

While for the period of "maximum accumulation" will have to consider that $[\theta A(1-b) - \lambda] < 0$,then the value will be redistribution to agents:

$$\begin{cases} J_1 = \dfrac{b\theta A K_0}{\lambda - \theta A(1-b)} \\ J_2 = 0 \end{cases}$$

Economic Growth

In this economy (assuming that the social planner takes the non-cooperation) is important to note that the rate of growth of per capita production will coincide with the growth rate of capital stock per capita and consumption per capita terms.

$$\gamma_y = \gamma_k = \gamma_{\bar{c}} = \theta \cdot A \cdot (1-b) \cdot c - n \tag{10}$$

However, the analysis of the law of evolution of capital per capita, leads us to three separate cases, in which two of them invite us to a possible steady state.

$$\dot{k} = [\theta A(1-b)c - n]k = 0 \quad \begin{cases} \text{Caso I}: k = 0 & \begin{cases} a)\ \theta A(1-b)c > n \\ b)\ \theta A(1-b)c < n \end{cases} \\ \text{Caso II}: k \neq 0 & \{c)\ \theta A(1-b)c = n \end{cases} \tag{11}$$

The three cases shown in (11) have different economic interpretations. Case I refers to the extreme state of an economy that has no capital stock or sold out to generate resources, which can generate two hypothetical subcases; a) An economy in which $\theta A(1-b)c > n$, then the law of evolution of capital stock, generates economic growth. Then an economy will be imposed as a prerequisite for generating economic growth, the implementation of this case. Being as amended the new golden rule of capital stock, to the simplicity of a difference, to be verified over time.

$$(1-s)A(1-b)c - n > 0$$

$$s < 1 - \frac{n}{A(1-b)c} \quad .$$

b) An economy in which $\theta A(1-b)c < n$, implying that the rate of economic growth would be decreasing over time.

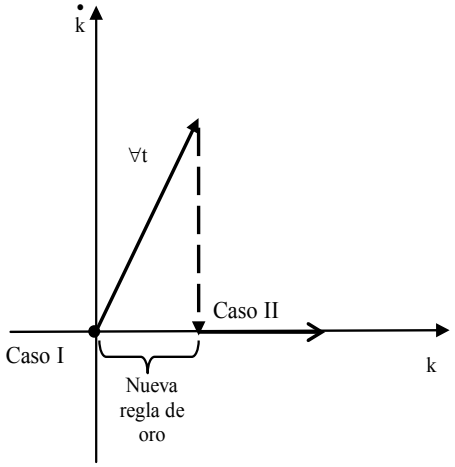
Case II is an economy where the population growth rate is equal to the value of $\theta A(1-b)c$, and given that $\theta = 1 - s$ where s is the marginal propensity to save in this economy, savings policy has led to a savings rate that does not generate economic growth:

$$(1-s)A(1-b)c - n = 0$$

$$s = 1 - \frac{n}{A(1-b)c}$$

Graphic evolution of the law of capital stock is represented in Figure 1.

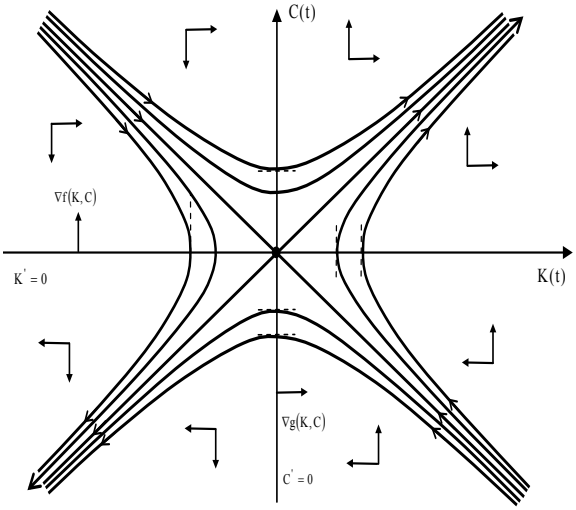
Figure 1: Law of Evolution of per Capita Capital Stock



This figure shows the law of evolution of per capita capital stock

Returning to the economic growth rates, according to Figure 1, the use of each case in the economy, results in different rates of growth in capital stock and output per capita. In case I, there is sub special cases of much economic interest. Therefore we build on the cooperative solution prompted by a social planner, and show the behavior of the economy from the period of "maximum accumulation" and " Maximum Consumption" The graphical depiction of this situation is presented in Figure 2.

Figure 2: Dynamics of Consumption and Capital (Phase Diagram)



This figure shows dynamics of consumption and capital (phase diagram)

In an economy, "Maximum accumulation", where the growth rate will be $\gamma_k = (1-b)\theta A - n$, assuming it meets the new golden rule, this growth rate will always be increasing over time, instead of approximating the value of the marginal propensity to save the value of $1 - \frac{n}{A(1-b)c}$, and the growth rate of capital stock will decrease continuously over time. Finally under a policy of "Maximum Consumption" the rate of economic growth will be negative, $\gamma_k = -n$. Met with the new golden rule, the dynamics of the model indicates that with increasing capital stock aggregate consumption is maximized.

The dynamics of the system shows a saddle point in which the only point of equilibrium is the origin, and solutions are the hyperbolic model, which shows that over time the consumption permanently grows which increases the capital stock in aggregate.

The Convergence of the Economies

To analyze convergence between countries, suppose there is a set of countries for which the parameters θ, A, b, c have the same values. If we assume that the only difference between them is the initial value of the stock of capital per person, k (0), then the model predicts that the growth rate of countries considered being constant and equal to $\gamma_y = \gamma_k = \gamma_{\bar{c}} = \theta \cdot A \cdot (1-b) \cdot c - n$. This model therefore predicts no convergence between the economies, absolute or conditional, since the growth rate is not related to income.

Suppose now that countries differ in the productivity parameter denoting, "A". Since the rate of growth of economies is given by equation (19), countries with high growth rates continue indefinitely, while those countries with low growth will remain forever with reduced growth rate regardless of income or value of its initial product.

IMPLICATIONS IN A DECENTRALIZED ECONOMY

We now proceed to find the optimal redistribution when there is no presence of a social planner who cares about the welfare of economic agents. As "economic agents", are called upon to find the values of decision (k_t) and (c_t). We assume there are two factor markets (production inputs), one for labor services, wages, denoted by "w_t", "r_t" is the rental price of capital. Based on the model introduced by Sidrauski (1967), in addition the Central Bank prints fiat money (with zero cost) and real assets in return get back to families in the form of a transfer S. Then, we define the variable "M" as nominal balances, "p" price index and "m" (M / p) real balances, and finally introduce the variable "$\pi = \frac{\dot{p}}{p}$" the rate of inflation in the economy. In real terms and per capita budget constraint of the representative household is given by:

$$w + rk + S = c + \frac{\dot{K}}{L} + \frac{\dot{M}}{p}$$

Where $\frac{\dot{M}}{p}$ represents the "investment" in nominal balances expressed in real terms. Note that: $k = \frac{K}{L} \Rightarrow \dot{k} = \frac{\dot{K}}{L} - kn$ and $m = \frac{M}{p} \Rightarrow \dot{m} = \frac{\dot{M}}{p} - \pi m$. Therefore the budget constraint of the representative family is amended:

$$w + rk + S = c + \dot{k} + kn + \dot{m} + \pi m \tag{12}$$

It is clear from (12) that real balances can be interpreted as an asset that depreciates at a rate equal to inflation π. The problem that the representative family, according to the consumption changes, is considered that of "worker" or "capitalist." Assuming that preference is given to consume the "worker" and then the "capitalist" maximizing the problems are:

$$J_1 = \int_0^{+\infty} \alpha(t) \cdot \theta \cdot f[k(t)] e^{-\lambda t} \cdot dt \tag{13}$$

$$J_2 = \int_0^{+\infty} (1 - \alpha(t))(1 - \beta(t)) \cdot \theta \cdot f[k(t)] e^{-\psi t} \cdot dt \tag{14}$$

s.a :

$$\dot{k} = w + (r - n)k + S - \alpha(t) \cdot \theta \cdot f[k(t)] - \left(\dot{m} + \pi m\right)$$

$$\dot{m} = \phi$$

The control variable is $\alpha(t)$, $\beta(t)$ and ϕ, the state variables are k and m. to express the problem in standard form defines an auxiliary control variable ϕ, so that $\dot{m} = \phi$. In this situation hamiltoneanos define two for each player respectively, so we have two "consumer's workers".

$$H_1(t,K(t),\alpha(t),\beta(t),\mu(t)) = \alpha(t)\cdot\theta\cdot f[K(t)]\cdot e^{-\lambda t} + \\ + \mu_1(t)\left[w + (r-n)k + S - \alpha(t)\cdot\theta\cdot f[k(t)] - \left(\dot{m} + \pi m\right)\right] \\ + \mu_2(t)[\phi] \tag{15}$$

And the "consumer's investors":

$$H_2(t,K(t),\alpha(t),\beta(t),\upsilon(t)) = [1-\alpha(t)]\cdot[1-\beta(t)]\cdot\theta\cdot f[K(t)]\cdot e^{-\psi t} + \\ + \upsilon_1(t)\left[w + (r-n)k + S - \alpha(t)\cdot\theta\cdot f[k(t)] - \left(\dot{m} + \pi m\right)\right] \\ + \upsilon_2(t)[\phi] \tag{16}$$

Applying the conditions of the principle of Maximum Pontrygain, for a couple of controls are optimal $(\alpha^*(t),\beta^*(t))$, we obtain:

$$\lambda = \pi \tag{17}$$

Solving for the "consumer investor", we have:

$$\psi = \pi \tag{18}$$

So we can say, equating (17) and (18), the value of the intertemporal discount factor for both players coincide with the rate of inflation in the economy, which in a decentralized economy, players have adaptive expectations, weighted with which to change their present consumption for future consumption, according to the perception of the rate of inflation. Thus for perceptions of a high inflation rates, players require more current consumption in exchange for future consumption and on the contrary, perceptions of a lower interest rate, players will be willing to give higher current consumption for future consumption.

The government's problem is simply to satisfy his budget constraint, assuming that transfers all proceeds from the creation of money. Then the following equation must be fulfilled:

$$S = \dot{m} + \pi m \tag{19}$$

Where S is the transfer given to the representative household. Thus, the budget constraint of the aggregate economy is obtained by substituting (19) into (12) and becomes:

$$\dot{k} = w + (r-n)k - c$$

Therefore, the condition of the maximum principle, for the player "consumer worker":

$$\mu_1 = \frac{[\theta\alpha(t)A + \pi]e^{-\pi t}}{[\theta\alpha(t)A - (r-n)]}$$

And the value of capital stock per capita, given a α will be:

$$k(t) = \frac{w}{(r - n - A\theta\alpha)} + \left(k_0 - k^*\right)e^{[A\theta\alpha+n-r]t}$$

And by the transversality condition, we have:

$$\lim_{t\to\infty}\left\{\frac{[\theta\alpha(t)A + \pi]e^{-\pi t}}{[\theta\alpha(t)A - (r - n)]} \cdot \left(\frac{w}{(r - n - A\theta\alpha)} + \left(k_0 - k^*\right)e^{[A\theta\alpha+n-r]t}\right)\right\} = 0$$

Which deduced that the value of $\alpha(t)$, will be the minimum value that can be taken so that the transversality condition is not altered. Therefore, the optimal value of $\alpha(t)$ is $\alpha^*(t) = a$
Similarly, for the player "consumer investor, the value of the variable being-be:

$$\upsilon_1 = \frac{[\theta(1 - \alpha(t))(1 - \beta(t))A + \pi]e^{-\pi t}}{[\theta(1 - \alpha(t))(1 - \beta(t))A - (r - n)]}$$

And the value of capital stock per capita, given α and β, will be:

$$k(t) = \frac{w}{(r - n - (1 - \alpha(t))(1 - \beta(t))A\theta)} + \left(k_0 - k^*\right)e^{[A\theta(1-\alpha(t))(1-\beta(t))+n-r]t}$$

And by the transversality condition, we have:

$$\lim_{t\to\infty}\left\{\frac{[\theta(1 - \alpha(t))(1 - \beta(t))A + \pi]e^{-\pi t}}{[\theta(1 - \alpha(t))(1 - \beta(t))A - (r - n)]} \cdot \left(\frac{w}{(r - n - (1 - \alpha(t))(1 - \beta(t))A\theta)} + \left(k_0 - k^*\right)e^{[A\theta(1-\alpha(t))(1-\beta(t))+n-r]t}\right)\right\} = 0$$

We deduced that the value of $\beta(t)$, will be the maximum value that can be taken so that the transversality condition is not altered. Therefore, the optimal value of $\beta(t)$ is $\beta^*(t) = d$. It is easy to realize that in this decentralized economy, we find the presence of steady state capital stock in per capita consumption. Likewise, and this because the long term, the per capita stock of capital that can generate "economic agents", is limited.

The capital stock steady state "consumer worker" is:

$$k^*(t) = \frac{w}{(r - n - A\theta\alpha)} \tag{20}$$

The capital stock steady state "consumer investor" is:

$$k^*(t) = \frac{w}{(r - n - (1 - \alpha(t))(1 - \beta(t))A\theta)} \tag{21}$$

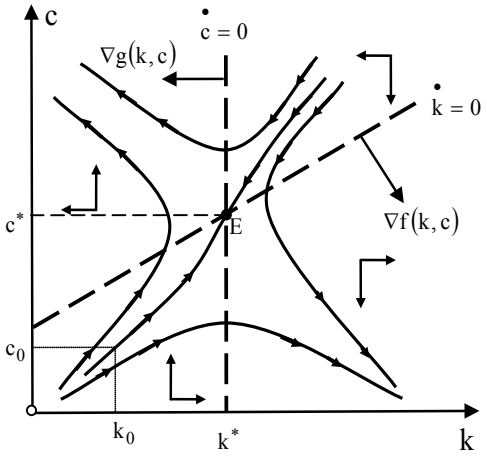
In both cases, we observe that there is a steady state with economic sense. We must consider as a necessary condition that $r > n - (1 - \alpha(t))(1 - \beta(t))A\theta$, so that increases in population growth result in higher interest rates in the economy.

Dynamics of the Decentralized Model

To study the dynamics of the model, we consider the dynamics governing the player "consumer worker". The dynamics of the player "consumer investor" is similar. To understand the dynamics of the model using the phase diagram of Figure 3, drawn on the plane (k_t, c_t). All points of the first quadrant are feasible, except the points on the vertical axis above the origin, with no capital (if $(k_t = 0)$), production is zero, and therefore "c" positive is not feasible.

The locus of points (k_t, c_t) that satisfies $\left(\dot{k} = 0\right)$ starts from the value of "w_t" and does not reach a maximum value of the stock of capital per capita. The locus satisfying $\left(\dot{c} = 0\right)$ is vertical to the stock of capital and is given as the steady-state value of capital stock. At any point above the locus $\left(\dot{k} = 0\right)$ the per capita capital is decreasing, the consumption is above the level that would keep constant. Similarly, k_t increases below the locus points $\left(\dot{k} = 0\right)$. In the case of the locus $\left(\dot{c} = 0\right)$, consumption increases to the left of that locus where $\left(k_t = k^*\right)$ and decreases to the right of the locus.

Figure 3: Dynamics of Consumption and Capital (Phase Diagram)



This table shows the dynamics of consumption and capital.

Only the trajectory started at a level of capital stock of "k_0" and "c_0" that will lead us along the time path that converges to the point "E" will be the optimal trajectory which must be met for the economy to converge to the steady state or that the transversality condition is satisfied.

Local Behavior around the Steady State

The liberalization of dynamics of the system generates other ideas on the dynamic behavior of the economy.

Linearizing the system around the steady state:

$$\begin{cases} \overset{\bullet}{k} = w + (r - n)k - c = \phi_1 \\ \overset{\bullet}{c} = \theta a A(A\theta a + n - r)(k_t - k^*) = \phi_2 \end{cases}$$

By Taylor's theorem and neglecting the terms with derivatives of order greater than one.

$$\phi_1(k,c) = \phi_1(k^*,c^*) + \frac{\partial \phi_1(k,c)}{\partial k}(k - k^*) + \frac{\partial \phi_1(k,c)}{\partial c}(c - c^*)$$
$$\phi_2(k,c) = \phi_2(k^*,c^*) + \frac{\partial \phi_2(k,c)}{\partial k}(k - k^*) + \frac{\partial \phi_2(k,c)}{\partial c}(c - c^*)$$

Considering the steady state:

$$\begin{cases} \overset{\bullet}{k}(t) \equiv \phi_1(k^*,c^*) = 0 \\ \overset{\bullet}{c}(t) \equiv \phi_2(k^*,c^*) = 0 \end{cases}$$

The linearization of the laws of motion in the vicinity of the steady state gives:

$$\begin{bmatrix} \overset{\bullet}{\tilde{k}} \\ \overset{\bullet}{\tilde{c}} \end{bmatrix} = \underbrace{\begin{bmatrix} \gamma & -1 \\ \delta & 0 \end{bmatrix}}_{J} \begin{bmatrix} \tilde{k} \\ \tilde{c} \end{bmatrix} \tag{22}$$

Where:

$$\begin{cases} \tilde{k} = k - k^* \\ \tilde{c} = c - c^* \end{cases} \Rightarrow \begin{matrix} \overset{\bullet}{\tilde{k}} = \overset{\bullet}{k} \\ \overset{\bullet}{\tilde{c}} = \overset{\bullet}{c} \end{matrix}$$

The system (22) has the following solutions:

$$\begin{aligned} \tilde{k} &= a_1 e^{\lambda_1 t} + a_2 e^{\lambda_2 t} \\ \tilde{c} &= b_1 e^{\lambda_1 t} + b_2 e^{\lambda_2 t} \end{aligned} \tag{23}$$

Where λ_1 and λ_2 are the characteristic roots or "eigenvalues" of the Jacobian matrix and a_1, a_2, b_1 and b_2 are constants to be determined. Calculation of eigenvalues:

$\lambda_1 = \frac{\gamma + \sqrt{\Delta}}{2}$ And $\lambda_2 = \frac{\gamma - \sqrt{\Delta}}{2}$

Where $\Delta = \lambda^2 - 4\delta$ is the discriminant, and as $\delta < 0 \Rightarrow \Delta > 0$, so the roots are real and distinct characteristics. In addition $\lambda_1 > 0$ and $\lambda_2 < 0$.

For the system formed by (23) converges to the steady state "E" we must remove him explosive effect λ_1. As we will impose $a_1 = b_1 = 0$ and taking as initial conditions "k_0" and "c_0":

$$k(t) = a_2 e^{\lambda_2 t} + k^* \Rightarrow k(0) = a_2 + k^* = k_0 \Rightarrow k(t) = \left(k_0 - k^*\right)e^{\lambda_2 t} + k^*$$
$$c(t) = b_2 e^{\lambda_2 t} + c^* \Rightarrow c(0) = b_2 + c^* = c_0 \Rightarrow c(t) = \left(c_0 - c^*\right)e^{\lambda_2 t} + c^*$$

Equating the value of $e^{\lambda_2 t}$ and clearing $c(t)$, we obtain:

$$c(t) = \frac{\left(c_0 - c^*\right)}{\left(k_0 - k^*\right)}\left(k(t) - k^*\right) + c^* \qquad (24)$$

Equation (24) represents the linear approximation of the optimal path around "E". The convergence rate is given by $|\lambda_2|$. In this case $|\lambda_2|$ is an increasing function of "r" (under perfect competition equals the value of $(f'(k) = A)$) and a decreasing function of "n". The higher the value of the interest rate of the economy, or equivalently, the higher the level of technology, the faster capital accumulation and the economy will converge to the steady state. However, higher levels of population growth, slower transition of the economy towards the steady state.

Economic Growth of Decentralized Economy

In this economy it is important to note that the rate of growth of per capita production will coincide with the growth rate of capital stock per capita and consumption per capita terms.

$$\gamma_y = \gamma_k = \gamma_{\bar{c}} = (w - c)k^{-1} + (r - n) \qquad (25)$$

The growth rate of the decentralized economy tends to be positive with higher wage levels per capita consumption per player, and higher interest rates to population growth.

Redistribution among Agents

For this decentralized economy, redistribution of consumption values for both agents, maximizing their consumption is:

$$\begin{cases} J_1 = \dfrac{a\theta Aw}{[r - n - Aa\theta]\pi} + \dfrac{\left(k_0 - k^*\right)a\theta A}{[r + \pi - n - Aa\theta]} \\ J_2 = \dfrac{(1-a)(1-b)\theta Aw}{[r - n - A(1-a)(1-b)\theta]\pi} + \dfrac{\left(k_0 - k^*\right)(1-a)(1-b)\theta A}{[r + \pi - n - A(1-a)(1-b)\theta]} \end{cases}$$

It should be noted that the payment received (redistribution of consumption) in the decentralized economy is greater than the payment received in a centralized economy (whether cooperative or not cooperative planned), this is explained because in this economy the inflation rate are each increasing with the increase in the level of wages, and thereby increases the intertemporal discount factor, so that agents require more current consumption for future consumption.

Economic Policy

Given the equation (17) and (18), in which we get $\psi = \lambda = \pi$, we can say that inflation is a function that depends on the consumption of agents. Econometric purposes, we propose the following equation for the behavior of inflation

$$\ln|\pi| = \beta_0 + \beta_1 \ln|C_t| \tag{26}$$

which can be rewritten as $\ln|\pi| = \ln|K| + \beta_1 \ln|C_t|$, where $K = e^{\beta_0}$ .Therefore an infinitesimal change in consumption will result in changes in inflation, given a level of consumption, $\frac{\partial \pi}{\partial C_t} = e^{\beta_0}\beta_1 C_t^{\beta_1 - 1}$. Equation (26) shows that with a consumption level higher than one, the level of inflation will be higher, while a consumption level of less than one, the economy will have deflation. It is also expected that the sign of β_0 is negative, and the value of β_1 is positive and known as the intertemporal setting the level of inflation.

On the other hand, when we speak of economic growth in the decentralized economy, there is no apparent steady state, but if the population growth rate exceeds the interest rate of the economy $(n > r)$, the economy reaches a steady state, with levels of consumption and capital stock of static (c^*, k^*). To extend the steady state in time, and increase economic growth, can adopt two policies: a) Reduce "n" or permanently increase the value of "r" or b) Increase the level of wages "w", so as to obtain a sequence in time with wage levels increased $\{w_a > w_b > w_c > ....w_\infty\}$ and thus increase the value of capital stock steady state shown in (20) and (21), thus increasing the value of steady-state consumption. Given this policy (24), the level of consumption over time is increasing, and considering (26), the short term will bring higher inflation. This series of contradictory policies, first to increase economic growth and secondly to increase the level of inflation, in a capitalist economy is referred to as "The paradox capitalist"

AN ALTERNATIVE SOLUTION: THE SHAPLEY SOLUTION

Assume that players agree to cooperate. The distribution solution thus obtained depends on the properties proposed. We study the results of the Shapley solution. Static cooperative games are studied by defining a characteristic function υ , which associates each coalition of players to coordinate their strategies in this dynamic version of the characteristic function assigned to each operator will be the payment received from his maximin strategy. The Shapley value for the case of two players is as follows:

$$\begin{cases} \phi_1 = \frac{1}{2}\left[\upsilon(\{1\}) + \upsilon(\{1,2\}) - \upsilon(\{2\})\right] \\ \\ \phi_2 = \frac{1}{2}\left[\upsilon(\{2\}) + \upsilon(\{1,2\}) - \upsilon(\{1\})\right] \end{cases} \tag{24}$$

Where:

$$\upsilon(\{1\}) = J_1\left(\alpha^*(t), \beta^*(t)\right) = \frac{b\theta AK_0}{\lambda}$$

$$\upsilon(\{2\}) = J_2\left(\alpha^*(t), \beta^*(t)\right) = \frac{(1-b)\theta AK_0}{\psi}$$

And considering the Pareto solution of the problem (8) into cooperative solution is:

$$\upsilon(\{1,2\}) = \frac{\psi a\theta AK_0 + (\lambda - (1-a)\theta A)((1-a)\theta AK_0)}{(\lambda - (1-a)\theta A)\psi}$$

Now, we find the value of cooperative mapping between the two players. For the agent "Consumer worker", the Shapley value is:

$$\phi_1 = \frac{1}{2}\left[\frac{\theta AK_0[\psi(b+\lambda a) + \lambda(\lambda - (1-a)\theta A)(b-a)]}{\lambda\psi(\lambda - (1-a)\theta A)}\right]$$

And, for the agent "Consumer investor";

$$\phi_2 = \frac{1}{2}\left[\frac{\theta AK_0[\lambda(1-b+\psi) + (\lambda - (1-a)\theta A)(\lambda(1-a) - \psi b)]}{\lambda\psi(\lambda - (1-a)\theta A)}\right]$$

It is easy to realize that the payments received in cooperation between agents are much larger than available in a centralized and decentralized economy.

CONCLUSION

The innovations of the Lancaster model involving the existence of different discount rates for each of the players and the introduction of an institutional framework that annotates player control, significantly enriches the analysis of differential game of economic growth. We can say that equilibrium of the game found from the perspective of a centralized economy, are established in the value of redistribution between agents, by the parameters (A, λ, ψ, θ)and the values set in the political process dimension to the discretion of the players control (a, b, c, d) and the Nash solution obtained is an optimal bang-bang type, optimum control for the capitalists of c , which is interpreted as the minimum permissible capitalization which must govern the social planner to maximize consumption in the economy. It determines a Pareto optimal set of all possible payments in the game, prompted by the social planner and establishes controls that reach, denoting two stages in this process of capital stock, accumulation and maximum consumption.

With respect to the dynamics of the model, we obtained positive growth rates and constant over time and phase paths of the model show a globally unstable system, but show a steady growth in consumption with increases in the capital stock. It is the solution based on decentralization, in which each player's optimal controls are reversed to those found in the centralized economy, where the player gets a capitalist optimum control variable value at its maximum dimension (higher levels of capitalization), while player worker obtains optimal control variable at its minimum value of dimension (extremely low consumption values). And, unlike the centralized economy, steady states are obtained in the economy, and rates of discount factor equal to the rate of inflation. From this perspective, the economy will have high interest rates and the dynamics of the model, leads to continued increases in the level of wages ending with higher inflation rates. It is evident that the value of redistribution of consumption in the decentralized economy is greater than from a centralized economy.

Economic policy can be adopted in a decentralized economy, showing that inflation is determined under the econometric equation proposed in this research, and that the rate of economic growth reaches a steady state if the population is growing greater than the interest rates of the economy. It was shown that increasing the level of wages results in short run higher inflation. Economies that have no monetary support are advised not to increase the level of wages unconsciously.

We also conducted an analysis of a cooperative solution between agents (Shapley value), where these covenants and agreements of the game both reach maximum levels of consumption. This solution proved that the rate of economic growth will be negative and the value of redistribution among agents is greater than available in a centralized and decentralized economy.

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ACKNOWLEDGEMENTS

I wish to thank Professor Ciro Bazán (USAT) for their valuable comments and suggestions. Also thank the compression of my mother and sisters, as my partner Cinthya Matta.

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A MODEL FOR THE INTERVENTION OF A FINANCIAL CRISIS

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ABSTRACT

This paper builds a model for intervention and/or mitigation of a financial crisis by first identifying those conditions precedent to a systemic based financial crisis, and then outlying a process to integrate firm specific and systematic risk into a comprehensive strategic model. A simple application of the model was able to identify significant outliers. For example, using 2006 to 2010 data, Capital One Financial Corporation was identified for intervention from as early as 2006. This corporation received $3.56 billion of the Emergency Economic Stabilization Act Federal bailout funds.

JEL: G01 - Financial Crises, G28 - Government Policy and Regulation

KEYWORDS: Systematic risk, financial crisis, banking, reform, failure, regulation, capital, interconnectedness, macro-prudential, micro-prudential

INTRODUCTION

In hindsight, regulators and analysts, alike, have been able to identify several factors that led to the Financial Crisis that began in 2007 (Poole, 2010b). The causes presented include factors such as: inadequate regulation; duration mismatch; federal subsidy of housing; federal subsidy of debt financing; moral hazard; interconnectedness of institutions; and unmanaged systematic risk (Lal, 2010; Poole, 2010a; Poole, 2010b; Scott 2010; Leondis, 2010; Ennis and Keister, 2010). Unfortunately, historically, bank regulations tend to be passed in response to various crises rather than to prevent them from occurring although there is no doubt that financial institutions play an integral role in the functioning of the economy and should be given priority (Barth et al. 2010; Holowecky et al. 2010). Therefore, going forward, the important question that needs to be answered is: *In foresight, how can we prevent or mitigate future financial crises, and what regulation is required?*

The remainder of the paper attempts to answer that question. The next section is a continuation of the review of the literature introduced here in the introduction. The literature review focuses on identifying conditions precedent to a financial crisis, and then on building a model to prevent or mitigate future crises. The following section presents data and analysis of a simple application of the model. The final section summarizes the paper and makes recommendations for further research.

LITERATURE REVIEW AND MODEL DEVELOPMENT

In reviewing the literature, prevention solution options presented include recommendations to: alter capital requirements; change clearing houses usage requirements; alter the way insolvent institutions are resolved; continue emergency lending by the Fed, and restructure the regulatory system All such solutions have been argued to be burdensome and ineffective to prevent a systematic risk based crisis (Scott, 2010). In his paper, Scott concentrated on reviewing the literature on the relevant recommendations of the Committee on Capital Markets Regulation (CCMR) and The United States Treasury as well as pending congressional legislation. The CCMR is an independent, nonpartisan research organization founded in 2005 to improve the regulation of United States capital markets. It consists of 30 leaders from the investor community, business, finance, law, accounting and academia (CCMR, 2011).

Evidence of the ineffectiveness of the proposed solutions is seen in the failure of Basel II, the recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision created by the central bank Governors of the Group of Ten nations passed in 2004. The Basel III documents submitted in 2009 attempt to answer the question of "What regulation is required?" and its provisions include: changes in the definition of capital; revisions to counter party credit capital standards; new global leverage ratio; explicit capital buffer standards; and new global liquidity standards (Holbrook, 2010). Among other things, these provisions are an attempt to improve the regulation of the financial system but still leave significant systematic risk exposure which is one of the main factors that helped cause the crisis in the first place (Boerner, 2010; Holbrook, 2010; Weber, 2010; Triana, 2010). For example, Berger et al (2008) show that Bank Holding Companies (BHC) had been actively managing their capital ratios, had set targets substantially above regulatory minima and make rapid adjustments towards those targets. Even the new regulatory requirements under Basel III would not have been adequate to prevent the crisis. Triana (2010) further shows that Basel III: permits higher leverage (higher risk); has flawed risk measures; and restricts opportunities for higher potential returns – increases risks and lowers returns.

If these solutions presented are indeed ineffective and/or incomplete then the use of early, reliable indicators to signal trouble and trigger intervention could prove invaluable. The next step then is to provide valuable information in answering the question of how to prevent or mitigate future financial crisis by focusing on managing systematic risk and by developing a model that identifies factors that can signal trouble and trigger intervention.

Conditions Precedent of the Financial Crisis

There have been many factors identified in the cause of the financial crisis that began in 2007 and there is no clear consensus as to whether regulatory reform would serve to prevent such a crisis from recurring. However, there is consensus on the following three conditions precedent:

Large losses from lending and securitization: This is macro systematic risk related to over-exposure in an upswing of a credit cycle and being overly risk averse in a down cycle (Stucke, 2010). Risk build-up in an expansion is countercyclical (Weber, 2010).

Interconnectedness: This is macro systematic risk related to the failure of one significant institution, which can cause or contribute to the failure of other significant institutions; and the possibility that one exogenous shock may cause or contribute to the failure of multiple significant financial institutions (Scott, 2010).

Loss of Confidence: This is macro systematic risk related to the level of financial transactions that are not regulated and/or protected, the level of uninsured deposits, credit default risk exposure, innovations such as information technology or information asymmetry (Scott, 2010; Poole, 2010a). Ennis and Keister (2010) conclude that financial crises have a self-fulfilling component and that the banks' operating structure makes them susceptible to runs and so they are innately fragile.

Modeling Considerations

This paper contends that the measures of those conditions precedent can serve to provide early warning signals of changes in systematic risk and be used in conjunction with regulatory reform to trigger pre-crisis intervention. Additionally, according to Allen and Saunders (2004) U.S. banking regulators have contended that 15-20 major banks and 5-10 major securities firms dominate critical financial markets, therefore as global financial markets consolidate and harmonize the possibility of contagion risk

increases. However, this smaller list of key players could provide a more narrowly focused intervention/mitigation strategy.

The hypothesis broadly stated, therefore, is:

Decision to intervene = $\boldsymbol{f}$ (credit countercyclical risk, interconnectedness, loss of confidence) (1)

Allen and Saunders (2004) define pro-cyclicality as system-wide operational losses triggered by contagion across linked financial intermediaries. They surveyed the effects of pro-cyclicality on risk measures and found that, whereas a fundamentally strong institution can often recover from market and credit risk, it may be impossible for it to recover from certain operational risk events. Therefore, the main concerns are the low frequency/high severity risk events, which occur quite infrequently, consistent with the conditions precedent.

Franz (2010) has shown that the stock market has been highly consistent in predicting economic expansions and contractions. Additionally, Tsai and Chang (2010) have also shown that since macroeconomic factors are affected by government actions, macroeconomic and firm specific factors must be dealt with separately. Their model establishes financial factors, market variables and macroeconomic variables, to successfully predict financial distress.

A review of the literature relating to procyclicality tendencies of banking shows how banking capital requirements along with monetary policy actually results in the amplification of exogenous shocks. One key factor affecting the magnitude of the procyclical effect is measured by the composition of the banks' asset portfolio (Drumond, 2009). This would then be combined with a measure of macroeconomic policy to estimate the systematic risk associated with procyclical effects.

Measures of interconnectivity relate to size and so identification of those major banks and securities firms, that dominate the market, is critical.

The factors leading to loss of confidence have to do with the innate fragility of the banking system and can be measured by the leading indicators such as the movement of the stock market as well as bank specific risk factors in their operating environment.

Recommended Process

Step 1: Utilize a financial distress prediction model to identify firm specific risks such as a discrete-time hazard model like the multi-period logit model, which has been used successfully to estimate the significant parameters in predicting financial distress (Tsai and Chang, 2010, Shumway 2001; Barrow, 1993). The assumed functional form of the logit model is the logistic function:

$$\Pr [Y_i=1) = Pi =, (1/(+e^{W_i}), \qquad i = 1...N \qquad (2)$$

Where,

$$Wi = b_0 + \sum^{m} b_j x_{ij} \qquad (3)$$

is the logit transformation and is a linear combination of the independent variables and a set of coefficients $b_j = (b_1, b_2, ...b_m)$ that can be estimated. N is the number of observations; x is the value of the jth variable of the ith observation; and Y sub $_i$ is a dependent variable that represents the final outcome: $Y_i = 1$ for failed institutions, $Y_i = 0$ for non-failures.

For this application, it is assumed that there is some linear combination of the independent variables that is positively related to financial distress. If Wj exists, it is an index of that institution's propensity to fail or become solvent.

Step 2: The parameters from Step 1 can then be used to identify problem financial in conjunction with a predetermined distress cut-off point.

Step 3: To address the issues of interconnectivity and pro-cyclicality, the next step is to identify the large financial institutions that have a significant impact on economic activity.

Step 4: Closely monitor those institutions identified in Step 3 for vulnerability.

DATA ANALYSIS

There were two key sources of banking data. The first is from Wharton Research Data Services (WRDS), a web-based business data research service from The Wharton School at the University of Pennsylvania. Their Bank Regulatory Database contains five databases for regulated depository financial institutions. These databases provide accounting data for bank holding companies, commercial banks, savings banks, and savings and loans institutions. Their data comes from the required regulatory forms filed for supervising purposes. The second source of data is from the National Information Center (NIC), a central repository of data about banks and other institutions for which the Federal Reserve has a supervisory, regulatory, or research interest, including both domestic and foreign banking organizations operating in the United States. Their web site provides access to NIC data, allowing the public to search for detailed information about banking organizations.

The NIC has a Bank Holding Company Peer Groups report that contains a summary of peer group financial data and a listing of Bank Holding Companies (BHCs) in each Peer Group. BHCs with assets over $500 million are classified into one of nine tiers. Tier 1 consists of BHCs with consolidated assets of $10 Billion and over. Given that only the top 20 or so financial institutions dominate the financial markets, the top tier 1 banks with consolidated assets of $100 billion were selected for review. Table 1 shows 22 institutions that met the criteria. These are the main institutions to monitor in addressing the interconnectedness and pro-cyclicality systematic risks considerations and therefore, the key financial institutions that should play a major role in the financial crisis intervention or mitigation process. Note, however, that the number is not static.

Fundamental company data was provided by Capital IQ, a business owned by the Standard and Poors Company and accessible from WRDS. Capital IQ provides market data across all major quoted markets including equity, mutual funds, fixed income, indices, commodities, currencies, and rates. Equity pricing data includes close, open, bid, ask, mid, low, best, high price values along with volume, splits, dividends, ticker, exchange information, short interest data, and VWAP for select markets. Upon retrieving the data it was discovered that due to various reasons, such as reorganizations (TD Bank Holding Company, U.S. Bankcorp, Ally Financial Inc. and Citizens Financial Group) or is privately held (Taunu Corporations), there were only 17 BHCs with complete market price data for analysis.

Following on Franz (2010), it is assumed that the stock market is consistent in anticipating economic cycles. To confirm this assumption, S&P 500 index monthly data was compared with the adjusted stock prices for the 17 banks using the Pearson product-moment correlation coefficient (r). It ranges from +1 to -1. A correlation of +1 means that there is a perfect positive linear relationship between variables. Table 2 and Figure 1 show the results for the five-year period reviewed, 2006 to 2010.

Based on the "Rule of Thumb" shown in Table 3, there was a very strong correlation between the variables during the period 2006 and 2010, inclusive with no outliers. The period 2006 was chosen to establish a base correlation before the financial crisis that began in 2007. There was a high correlation between the variables with an outlier exception of Capital One Financial Corporation that had a correlation coefficient of -0.471 and was the recipient of $3.56 billion of the Emergency Economic Stabilization Act Federal bailout in the form of a preferred stock purchase. (WRDS, 2010). The same analysis was done on 2010 to have current data. The correlations in 2010 were moderate, on average, with the outlier exception of Bank of America Corporation, which had a correlation coefficient of -0.0857. It lost $2.24 billion for 2010 as gradual improvements in its core banking business were offset by charges linked to its disastrous 2008 acquisition of Countrywide Financial (WDRS, 2010). Figure 1 shows the correlation results as well as the magnitude of the outliers, banks number eleven and one, respectively.

Table 1: BHCs with consolidated assets of $100 Billion and above as of 12/31/2010

Rank	Institution Name	Location	Total Assets 12/31/2010 ($'000)
1	Bank of America Corporation	Charlotte, NC	$2,268,347,377
2	JPMorgan Chase & Co.	New York, NY	$2,117,605,000
3	Citigroup Inc.	New York, NY	$1,913,902,000
4	Wells Fargo & Company	San Francisco, CA	$1,258,128,000
5	Goldman Sachs Group, Inc.,	New York, NY	$911,330,000
6	Morgan Stanley	New York, NY	$807,698,000
7	MetLife, Inc.	New York, NY	$730,905,863
8	Taunus Corporation	New York, NY	$372,556,000
9	HSBC North America Holdings Inc.	New York, NY	$343,699,907
10	U.S. Bancorp	Minneapolis, MN	$307,786,000
11	PNC Financial Services Group, Inc., The	Pittsburgh, PA	$264,414,112
12	Bank Of New York Mellon Corporation, The	New York, NY	$247,222,000
13	Capital One Financial Corporation	Mclean, VA	$197,503,411
14	Td Bank Us Holding Company	Portland, ME	$176,972,361
15	SunTrust Banks, Inc.	Atlanta, GA	$172,875,298
16	Ally Financial Inc.	Detroit, MI	$172,011,000
17	State Street Corporation	Boston, MA	$158,890,975
18	BB&T Corporation	Winston-Salem, NC	$157,081,396
19	American Express Company	New York, NY	$146,005,718
20	Citizens Financial Group, Inc.	Providence, RI	$129,969,527
21	Regions Financial Corporation	Birmingham, AL	$132,399,290
22	Fifth Third Bancorp	Cincinnati, OH	$111,006,778

This table shows the 22 Tier 1 Bank Holding Companies with assets of $100 billion or more, taken from the list of top 50 BHCs. There were 34 institutions with consolidated assets over $50 billion. Source: http://www.ffiec.gov/nicpubweb/nicweb/Top50Form.aspx

Table 2: The Pearson's Correlation Coefficient for the S&P 500 and Our Top Banks

Period/Variable	***Average r for the 17 banks***	***n***
Monthly statistics 2006-2010	0.836	60
Monthly statistics 2006	0.728	12
Monthly statistics 2010	0.581	12

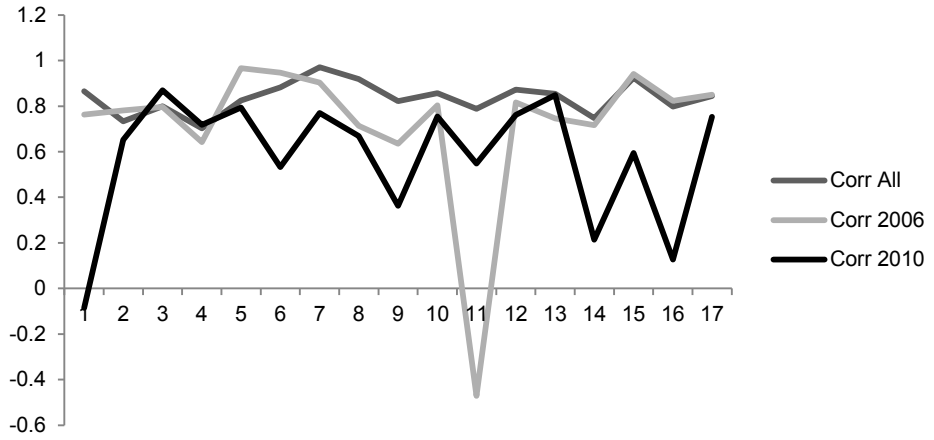
This table shows the results of the correlation analysis between the S&P 500 indices and the adjusted stock price for the 17 BHCs for the three time-periods indicated.

Table 3: Rule of Thumb for Interpreting the Size of a Correlation Coefficient

Size of Correlation	*Interpretation*
0.90 to 1.00 (-0.90 to -1.00)	Very high correlation
0.70 to 0.90 (-0.70 to -0.90)	High correlation
0.50 to 0.70 (-0.50 to -0.70)	Moderate correlation
0.30 to 0.50 (-0.30 to -0.50)	Low correlation
0.00 to 0.30 (0.00 to -0.30)	Little if any correlation

Source: Hinkle DE, Wiersma W, Jurs SG. (1998). Applied Statistics for the Behavioral Sciences, 4th ed. Boston, Houghton Mifflin Company.

Figure 1: Plot of the Correlation Coefficients for the 17 Institutions by Rank



This figure 1 shows the correlation coefficient (r) between the monthly S&P 500 indices and the stock price of the top 17 banks using 2006 to 2010 data, 2006 data and 2010 data. The outlier in 2006 was Capital One Financial Corporation and the outlier in 2010 was Bank of America Corporation.

CONCLUSION

This paper reviewed the literature on the causes of financial crises and many solution ideas, including those recommended by Basel III submitted in 2009, the Group of Ten's Basel Committee on Banking Regulation. The suggestions presented were found to be either ineffective or incomplete. After closely reviewing the proposals and analyses submitted by regulators and analysts, there seemed to be consensus on three key systematic risk factors: large losses from lending and securitization; interconnectedness; and loss of confidence. A four-step process is then presented. Critical to the process is the ability to predict firm specific risks separate from macroeconomic risks. A simple application of the model using 2006 to 2010 data showed how, for example, Capital One Corporation could and should have been flagged for intervention from 2006, before anyone had an idea of the crisis to come. In addition, the model has flagged Bank of America Corporation, using the 2010 data.

The application of the model used only one variable, however the full application of the model could use several variables in a more complex intervention matrix. Further study and extensions of the findings of

this paper could integrate the four steps, and using all relevant variables, such as bank specific risk factors, in a comprehensive strategy for intervention and mitigation of future financial crises.

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IMPLEMENTING SOLARIS CONTAINERS TO INCREASE PERFORMANCE AND SCALABILITY OF FINANCIAL MANAGEMENT SOFTWARE

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ABSTRACT

This paper examines Virtualization Technologies which are popular in modern financial management systems. Many researchers and financial systems administrators have researched the techniques related to utilizing server computational resources. Currently there are many technologies for this purpose. These technologies include running multiple applications, and multiple operating systems on the same hardware, like: VMWARE, Linux-VServer, VirtualBox and Xen. These technologies try to solve the problem of resource allocation from two approaches: running multiple operating system instances on the same hardware and virtualizing the operating system environment. Our study presents an evaluation of scalability and performance of an operating system virtualization technology known as Solaris Containers. The main objective is to measure the influence of a security technology known as Solaris Trusted Extensions for securing financial management software.

JEL: L86, M15, C88

KEYWORDS: Financial Management Systems, Solaris Containers, Trusted Extensions, ERP Systems, Kernel-Based Virtualization

UDC: 004.63

INTRODUCTION

In recent years, many projects have focused on virtualization of financial management system environments, using different technologies and operating systems (OS) such as FreeBSD Jail, Linux-VServer and Virtuozzo. Kernel based virtualization is a technique based on using a single underlying operating system kernel. Using this paradigm the user can potentially run multiple financial applications in isolation from each other. The basic idea is to run groups of processes that cannot be interrupted by others in different virtual environments.

Solaris containers are built on the same paradigm, offering virtualization on the operating system-level. Solaris approach is to extend its virtual operating system environment to include more features of a separate machine, such as a per-container console, dedicated system log, packaging database, run level, identity (YP, NIS), and IPC facilities. They make it possible to run more than one instance of the operating system into the same kernel. Many resources of Data Center's Server architectures are usually not properly and efficiently used, like CPU cycles and RAM storage. With this technology we can better utilize these resources and make them useful for all financial management software.

These containers act as completely isolated virtual machines within a computer, aiming to reduce costs in both, hardware and system administration. Furthermore, the Solaris Containers mechanism can provide protection through compartmentalization for separate virtual machines on a single physical machine. This technology is cheaper to install and configure, because only a single OS copy is involved in contrast to several OS instances in the case of Xen. Furthermore, unlike logical partitioning it is not limited to high-end systems. Moreover, the granularity of resource allocation is finer-grained than logical partitioning. In

comparison to virtual machine monitors, Solaris Zones reduces performance overhead and reduces the cost of administration because there are no multiple operating system instances in a system.

The paper is organized into following sections: the literature review section provides the main concepts of how Solaris Operating Systems use the Kernel virtualization technology by means of containers and zones. In this section we also discuss the advantages and disadvantages of containment strategies. The data and methodology section presents the test-bed system to be used with AIM Benchmark tool, provide a detailed topology of the system to be tested and discuss several testing scenarios. The results section provides results of all testing scenarios carried out. The concluding comments section summarizes the main findings of the work, explains the limitation of the study, proposes recommendations and suggestions for future research work.

LITERATURE REVIEW

Solaris/OpenSolaris are operating systems developed by Sun Microsystems primarily to support server applications. An operating system is the main building block of a computer system, providing high level abstraction to an easy to use interface between user applications and complicated computer hardware. On the other hand, an operating system can also be considered software that acts as an intermediary between the user and the hardware. The main purpose of an operating system is to provide an easy to use environment in which a user can execute programs in a convenient and efficient manner. As stated by Silberschatz (2002), Solaris operating system is a multiuser, multitasking, multithreading operating environment, developed by Sun Microsystems.

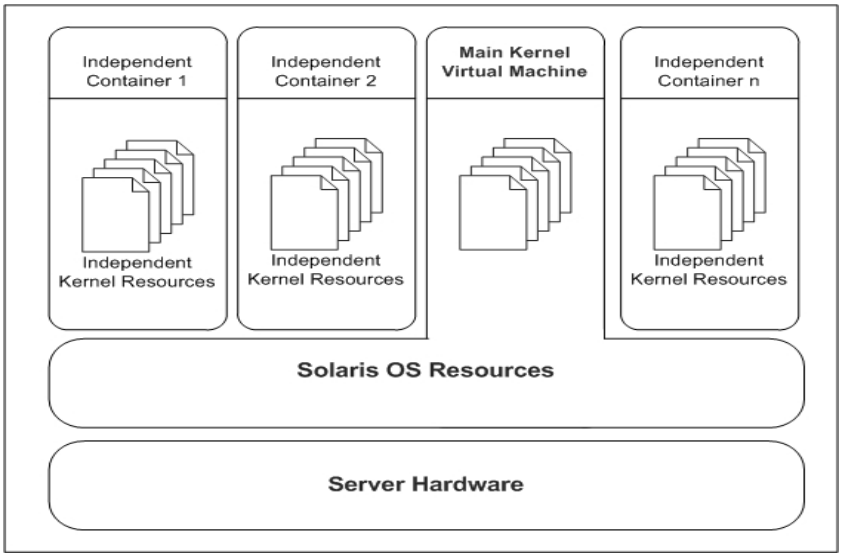
Solaris is considered and falls within Unix-based operating systems, introduced by Sun Microsystems in 1992 as the successor to SunOS. Solaris is well known for its scalability and performance especially on SPARC architecture servers, and also for its remarkable features such as Zones, DTrace and ZFS. The majority of its code-base is now open source software via the OpenSolaris project. Watters (2005) explained that OpenSolaris is an open source operating system based on Sun Microsystems' Solaris. It is derived from the Unix System V Release 4 code-base, with significant modifications made by Sun since it bought the rights to that code in 1994. It is the only open source System V derivative available (Sun Mirosystems, 2005).

The Sun Microsystems' "Solaris Containers" technology is similar to the implementation of FreeBSD jail. It provides same functionalities like Chroot, but with more features. Zones allow running of many applications simultaneously within isolated containers on a single Solaris operating system. Price and Tucker (2004) consider each zone as having its own unique process table and management tools that allow each container to be rebooted, configured, and upgraded independently of each other. To increase security each zone is assigned personalized root privileges and file systems. Figure 1 depicts the kernel virtualization technology using the containers approach.

Solaris Zones are a component of the Solaris Container environment. A zone is a virtualized operating system environment created within a single instance of the Solaris operating system. When creating a zone an execution environment is produced where processes are isolated from the rest of the system. This isolation prevents processes running in one zone from monitoring or affecting processes running in other zones. Even with super-user permissions, a process cannot view or affect activity in other zones. As described on Slicing and Dicing servers (2005), a zone also provides an abstract layer that separates applications from the physical attributes of the machine like physical device paths. A maximum number of 8192 zones can be created on a system. There are two types of non-global zone root file system models, sparse and whole root. The sparse root zone model optimizes the sharing of objects. The whole root zone model provides the maximum configurability.

Zones are used for systems that integrate a number of applications on a single server. The advantage is lower cost and complexity of managing numerous machines, thereby enabling more efficient resource utilization of the system. Other advantages include the isolation and security introduced. As stated by Chandan (2005), zones have a higher level of security because an attacker breaking into the zone cannot break into the other non-global zones or into the global zone. So a zone is completely isolated and is transparent from the rest of the system. The zone communicates with the rest of the system through networking API as described by Lovvik and Balenzano (2005). A zone does not need a dedicated CPU, a physical device, or a piece of physical memory. These resources can be multiplexed across some zones, or allocated using the resource management feature. Some disadvantages are that zones need extra resources like file system usage, processor cycles and memory usage.

Figure 1: Kernel Virtualization Technology Using the Container Approach.



The figure shows the principal idea how the Kernel Virtualization technology is implemented on Solaris operating system by using the container approach which provides independent Kernel resources to individual containers.

Solaris zones partitioning technology provides a means of virtualized operating system services to create an isolated environment for running applications. As with all virtualization technologies, Sang-On and Dong-Soo (1999) explain that this isolation prevents processes that are running in one zone from monitoring or affecting processes running in other zones. Basic communication between zones is accomplished by giving IP network connectivity to each zone. An application running in one zone cannot observe the network traffic of another zone.

Victor (2006) suggests that by enabling trusted extensions on Solaris containers, isolation is maintained even though respective streams of packets travel through the same physical interface. The applications are also prevented from monitoring or intercepting each other's network traffic, file system data, or process activity. Actions taken by a zone administrator in a non-global zone do not affect the rest of the system. Roush and Thanga (2009) compared related containment technologies on other operating systems like Chroot (Unix OS), FreeBSD jails, Systrace, AppArmor, Xen and VMWare.

DATA AND METHODOLOGY

A Solaris container is a runtime environment for our financial applications. Parts of the container are Solaris 10 Resource Manager and Solaris Zones. Zones isolate financial application components like OpenERP and SugarCRM from one another even though they share the same instance of the Solaris OS.

The container establishes limits for resource consumption, such as CPU, memory and disc allocation. It is worth noting Sun's BrandZ technology, which used to run Linux applications on the Solaris operating system and we used that to run Linux precompiled binaries of SugarCRM. Linux Financial management software applications like OpenERP and SugarCRM run unmodified in the secure non-global zone environment.

To run our tests, we used the AIM Benchmark Suite by Caldera International, which is a job throughput benchmark widely used by UNIX computer system vendors. AIM is a program that forks many processes called tasks, concurrently running random set of subtests called jobs. There are 53 types of jobs, with different aspect of the operating system, such as disk-file operations, process creation, user virtual memory operations, pipe I/O, and compute-bound arithmetic loops.

Each sub-run, reports a metric of jobs completed per minute, with the final report for overall benchmark being a table of throughput metric versus the number of tasks. A given system will have a peak number of tasks N at which jobs per minute is maximized. Either N or the value of the jobs per minute at N is the metric of interest. Peak performance is the highest jobs/minute the system achieved. Sustained performance is the square root of the total area under the performance curve up to the point of crossover. The point of crossover is that point at which the Jobs per Minute/User Load = 1.0. The JTI (job timing index) rating is the worst case JTI.

The test and experiments are based a hardware system configured as follows: HP Proliant ML Series, Genuine Intel ® CPU T2250 @ 1.73 GHz, Physical Memory 2048 MB (DDR2 PC2-5300), Intel EPRO-100 Fast Ethernet NIC. The computer is configured with an operating system and software as follows:
SunOS 5.11 i86pc Solaris, which is OpenSolaris 2008.11 but this are also applicable to Solaris 10,
AIM (advanced integration matrix) benchmark v7, OpenERP and SugarCRM using MySQL DB.

RESULTS

We completed our experiments based on the creation, installing and booting of zones, each with identical configuration with preinstalled OpenERP and SugarCRM. The goal of the experiments is to measure overhead introduced by zones regarding memory, storage and processing power on OpenERP and SugarCRM acting as financial management systems.

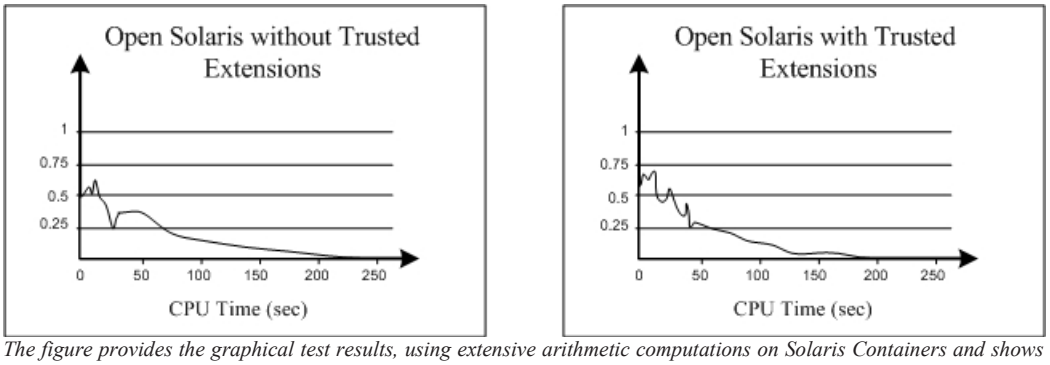
The first part consists of zone configuration and installation. We estimate the zone creation with the *time* and *du* utility to measure disk usage. Next we install the zone and estimate it by executing the command: '*time zoneadm –z zone install'* and then we receive results of package information and disk usage with the commands '*pkginfo'* and '*du –hs'*.

When installing a zone by default the whole directory tree is copied to the non-global zone thus increasing the installation time and disk usage. In order to decrease this we use specified directories by the global zone directory tree by inheriting them.

With the same method, we show that in this way overhead introduced by creation and installation of zones is lower than the first one. The next experiments are based on AIM benchmark and show the performance of the system as a whole and the overhead introduced by zones with and without Trusted Extensions enabled. The benchmarks will evaluate the performance of a multiuser system (aim7) simulating a financial server system and single user system (aim9) based on a number of tests including arithmetic tests, disk/fs I/O tests, IPC, function calls and algorithmic tests. First we execute the benchmark only on the global zone without non-global zone installed. Then the benchmark is executed on the global zone with the running non-global zones with and without Trusted Extensions. The results of

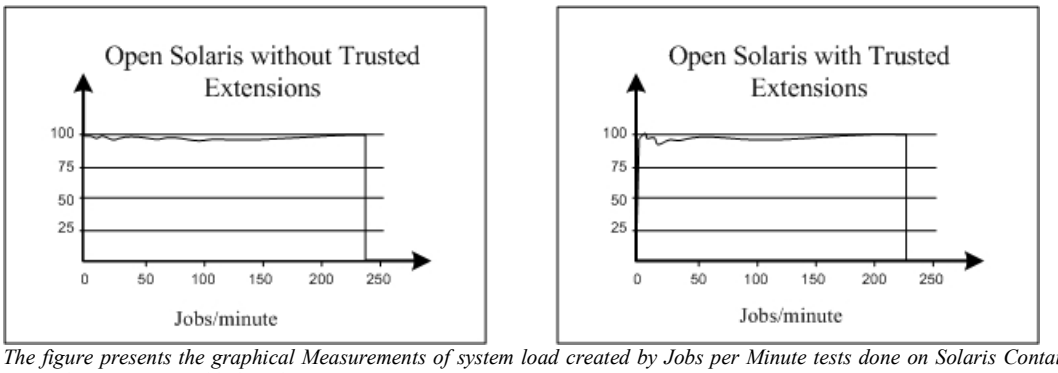
the AIM benchmark in the two cases without and with Trusted Extensions running, are presented in Figures 2, 3 and 4.

Figure 2: Average CPU Time Tests on the Containers without and with Trusted Extensions Enabled



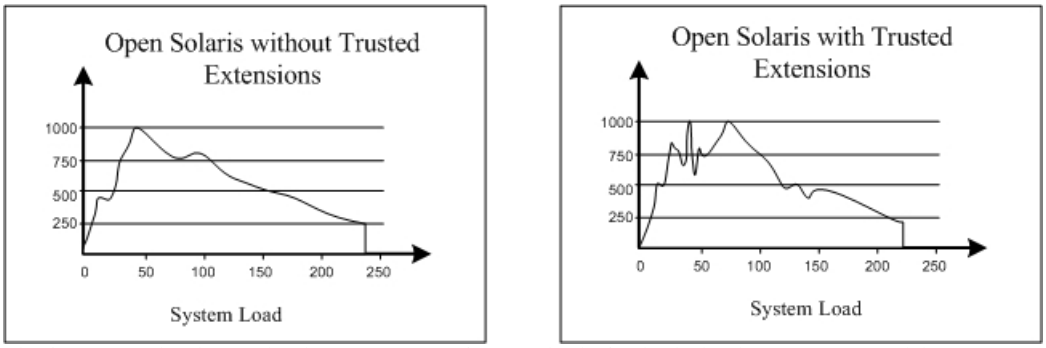
The figure provides the graphical test results, using extensive arithmetic computations on Solaris Containers and shows the effective CPU Time needed for such computations on the containers without and with Trusted Extensions enabled.

Figure 3: Jobs per Minute load tests on containers without and with Trusted Extensions enabled on them



The figure presents the graphical Measurements of system load created by Jobs per Minute tests done on Solaris Containers without and with Trusted Extensions enabled on them.

Figure 4: System load tests on containers with and without Trusted Extensions enabled.



The figure provides the graphical Measurements of System load of individual Solaris Containers while running OpenERP and SugarCRM applications under normal conditions at standard system loads with and without Trusted Extensions enabled.

CONCLUDING COMMENTS

The main purpose of this paper is to evaluate the performance and scalability of Solaris Containers by measuring the influence of Solaris Trusted Extensions on test scenarios which are commonly found in daily operations of financial management software.

All experiments were performed based on the AIM benchmark and provided live data on the performance of independent Solaris Containers working alone and the overhead introduced by enabling Trusted Extensions. The benchmarks provided graphical data indicating the performance of a multiuser system using Solaris Containers running tests including computational arithmetic tests, system load test and real financial software execution tests.

Based on the results of the tests and experiments the Trusted Extensions installation gives a fairly higher overhead to the system in terms of software CPU load, computational resources usage, memory and processing power. The number of packages that the zone requires to be installed, the time needed for the zone to be installed and the storage that the zone consumes are somehow lower. The approximate rates of time, package and disk usage between Trusted Extensions zone and whole root zone are 18/23, 1/9 and 1/3 respectively. These rates vary based on the configuration of the Trusted Extensions zone.

The performance and the overhead that a zone introduce to the system based on the benchmark is: Peak = 976.5/993.5, Sustained = 344.4/365.6, Minimum JTI = 91/92. Also from the single-user benchmark (aim9) results we can say that the values of the tests differ little from each other leading to the conclusion that in this way we have achieved better utilization of the hardware and operating system without affecting the overall performance of our financial management system. We have shown that with this virtualization technology we can efficiently use all of our server computational resources, thus achieving higher processing power for financial systems running OpenERP and SugarCRM software.

While the virtualization technology using Solaris Containers provides fair isolation between independent containers, there exist many security threats which can affect the isolated container itself. These threats are not discussed in this paper. They remain the same as for non-virtualized systems managed by operating system developers and implemented by system administrators through patches and system upgrades. The weak points of Containment strategies consists of implementation of virtualized device drivers using a lower operating system software which implements sharing of server resources among individual containers thereby opening a vulnerability issue for all Containers. This makes our Containers, even with Trusted Extensions enabled, susceptible to service denial attacks and degradation of financial services offered.

These issue are not considered on this paper but will be part of future research. Future work will consist of finding and proposing solutions for appropriate architecture of lower physical virtualization layers to better control server resources and share them with Containers closer to hardware resources rather than operating system layers.

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Caldera International AIM Multiuser Benchmark - Suite VII, Suite IX, Version 1.1., Inc http://www.caldera.com/en/.

OpenERP, http://www.openerp.com.

SugarCRM, http://www.sugarcrm.com.

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CLOUDSOURCING: MANAGING CLOUD ADOPTION

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Noriaki Izumi, National Institute of Advanced Industrial Science and Technology (AIST)
Kôiti Hasida, National Institute of Advanced Industrial Science and Technology (AIST)

ABSTRACT

Cloud computing adoption by organizations has been minor despite the initial optimism. The primary concerns obstructing adoption of cloud-based services are security, loss of control, and inadequate legislative. In a cloud-based model, information technology services are distributed and accessed over networks such as intranet or internet. Intranets are inside organizations and internet outside. The main concerns are inherently linked to employing services provided by other organizations and accessing them over internet. In such case, valuable organizational data and services are transferred to providers. The provider or other entities may compromise organizational data and services, thus posing significant security risks. By moving data and services to outside providers, organizations also loose substantial control over timely management and retention. Organizations must follow the rules set by the providers– which may not be well suited for them. The providers legally distance themselves from liabilities on important issues such as security, data loss and damage. There are also several other pertinent factors. Proper cloud computing adoption and utilization by organizations requires balanced approach. We elucidate various factors and highlight proper strategic concepts for effective cloud adoption management—benefiting both organizations and providers.

JEL: M15; O14; O32; O33; L86; K12; K23; K42

KEYWORDS: cloud computing, cloud providers, cloud-based systems, cloud services, web services, information technology management, knowledge management, risk management, actionable knowledge, knowledge-intensive organizations, knowledge workers.

INTRODUCTION

Cloud-based systems and services have been regarded as '*the next big thing*' by business communities, as well as technology and service providers—until WikiLeaks happened. The case of WikiLeaks plainly exposed intrinsic risks (Sternstein, 2011). What happened? WikiLeaks employed Amazon's cloud services for content and data hosting. Amazon, on a short notice, terminated its services to WikiLeaks and removed the content and data simply upon inquiry by US federal lawmakers (MacAskill, 2010; O'Connor, 2010). The shockwave strongly resonated with businesses. The lesson learned was clear: organizations cannot entrust their mission critical services and data to cloud providers.

Data and related information technologies are at the functional core of knowledge-intensive organizations. Organizations rely on a spectrum of information technologies supporting their operations (Alvesson, 2004). Information technology tools and services are indispensable for their efficient functioning (Ringel-Bickelmaier and Ringel, 2010). Knowledge workers depend on information technologies and data for completing their tasks. Information technology services are also enablers for achieving higher working and operating efficiencies (Davenport, 2005). Any impairment of organizational data or information technology tools and services translates to considerable losses for knowledge-intensive organizations. Hence, significant financial, physical and human resources are dedicated to management and innovation of organizational information systems and infrastructures.

Significant investments of organizations into information technologies attract cloud-based providers. They aim at providing information technology services to organizations for remuneration (Marston et al.,

2011). The essential idea behind the cloud-based business model is relatively simple. Organizations could outsource their information technology needs to cloud-based providers. Overall outsourcing costs should be lower than their information technology investments; hence, there are savings for organizations. Cloud-based providers supply services to multiple organizations, and employ the economy of scale. Thus, they can offer attractive pricing to customers and yet maintain reasonable margins (Kambil, 2009). On the surface, the cloud business model seems rational. However, there are several challenging issues.

This study highlights the pertinent issues and presents actionable knowledge for managers of information technologies. Managers should pay close attention to the presented points when adopting and implementing cloud computing and/or cloud-based services. We overview three essential variants of cloud computing models and concisely express their suitability for various implementations or adoptions. We explain their advantages and disadvantages, and provide managerial recommendations and consideration points. Understanding of the essential principles, as well as risks and benefits, enables knowledgeable decision-making and effective risk management.

The manuscript organization is as follows. The literature review section is followed by the 'Variants of Cloud-Based Models' section. It presents three main cloud computing models and concisely describes their characteristics. The next section, 'Categories of Cloud Services', provides a concise overview of three major categories of cloud services. Cloud computing models have positive and negative aspects. Concerning issues of cloud-based models are exposed in the section 'Cloud Related Concerns'. Beneficial aspects of cloud-based models are revealed in the section 'Cloud Related Benefits'. Organizations must carefully assess advantages and disadvantages according to their own conditions. Strategic recommendations for managers are highlighted in the section 'Actionable Managerial Recommendations'. The presentation finishes with a concise discussion and summary of the essential points in the section 'Conclusions'.

LITERATURE REVIEW

Cloud computing is not a technologically new paradigm (Howie, 2010). The core technologies incorporated in cloud computing model have been readily available. Why is it then that earlier day 'distributed computing' emerged today as 'cloud computing' (Cubitt et al., 2011)? To understand this re-emergence, it is useful to view adoption and deployment of information technologies in organizations in a greater perspective.

During earlier adoptions of information technologies by organizations, there has been a lack of coordinated longer-term strategy and planning (Butler and Murphy, 2007). Departments within the organization, and their branches, have been deploying information systems meeting their specific needs (Palanisamy et al., 2010). This has led to a number of installations having overlapping functionalities yet lacking interoperability (Papastathopoulou et al., 2007). As a result, management and maintenance costs of information technologies have risen sharply. To reduce rising costs, the necessity to economically coordinate, merge and manage distributed information technology resources has surfaced (Georgantzas and Katsamakas, 2010). Drastic reduction of information technologies and adoption of uniform platforms within organizations was not a solution. It would be costly due to significant reengineering and personnel retraining. A feasible solution to the problem emerged in a form of organizational portals (Sullivan, 2004; Collins, 2000). Portals provide a single-point access to distributed organizational resources (Oertel et al., 2010). The bridging technology between diversity of localized implementations and single unified access point has been the service-oriented architecture and design (Rosen et al., 2008). The service-oriented architectures permit accessing information technology resources over networks such as intranets and internets–within or outside of organizations. Thus, allowing organizations efficiently re-use the existing information technologies and related resources.

Distribution of resources and their accessibility over computer networks have been the central characteristics of cloud computing (Linthicum, 2009). Cloud computing model embraces distribution of information technology resources and their *on-demand* provision via networked environments (Iyer and Henderson, 2010). Resources can be distributed physically across geographical locations or logically across servers. They are accessible within organizations via intranets and outside of organizations via internet. Standardized protocols facilitate communication over both intranet and internet networks. This model allows economically efficient utilization of computing hardware, software, and web services (Morton and Alford, 2009).

Cloud-based model has both advantages and disadvantages. Cloud-based providers generally emphasize advantages, such as speed and ease of deployment, while they downplay or hide risks. Security, control and legislative issues are among significant risks (Anthes, 2010; Lanois, 2010). Organizations must account for these, and other risks (Subashini and Kavitha, 2011; Hamlen et al., 2010; Julisch and Hall, 2010). Adoption of cloud-based model should be managed and approached in a balanced manner (McKinney, 2010).

Variants of Cloud-Based Models

Cloud computing models have three common characteristics: distribution of resources, accessibility via computer or communication networks, and on-demand provision (Rimal et al., 2011). Information technology resources may be distributed across geographical locations, hardware and virtual environments. Geographical distribution refers to physical locations where infrastructure, hardware or services are located. Physical locations are chosen with respect to various factors; such as favorable legislation, utility costs and personnel availability. Hardware-level distribution refers to allocation of physical hardware resources to specific services. For instance, one service may utilize computing power of several servers. Virtual-level distribution relates to segmentation of services across virtual environments that run on single or multiple hardware.

Accessibility of distributed information technology resources and services is facilitated by computer and communication networks (Frischbier and Petrov, 2010; Haeberlen, 2010). Standardized protocols are used for accessing resources over both intranet and internet. Insecure connectivity may be used on intranets within an organization. Secure connectivity is preferable for accessing resources outside an organization—over internet and public communication channels.

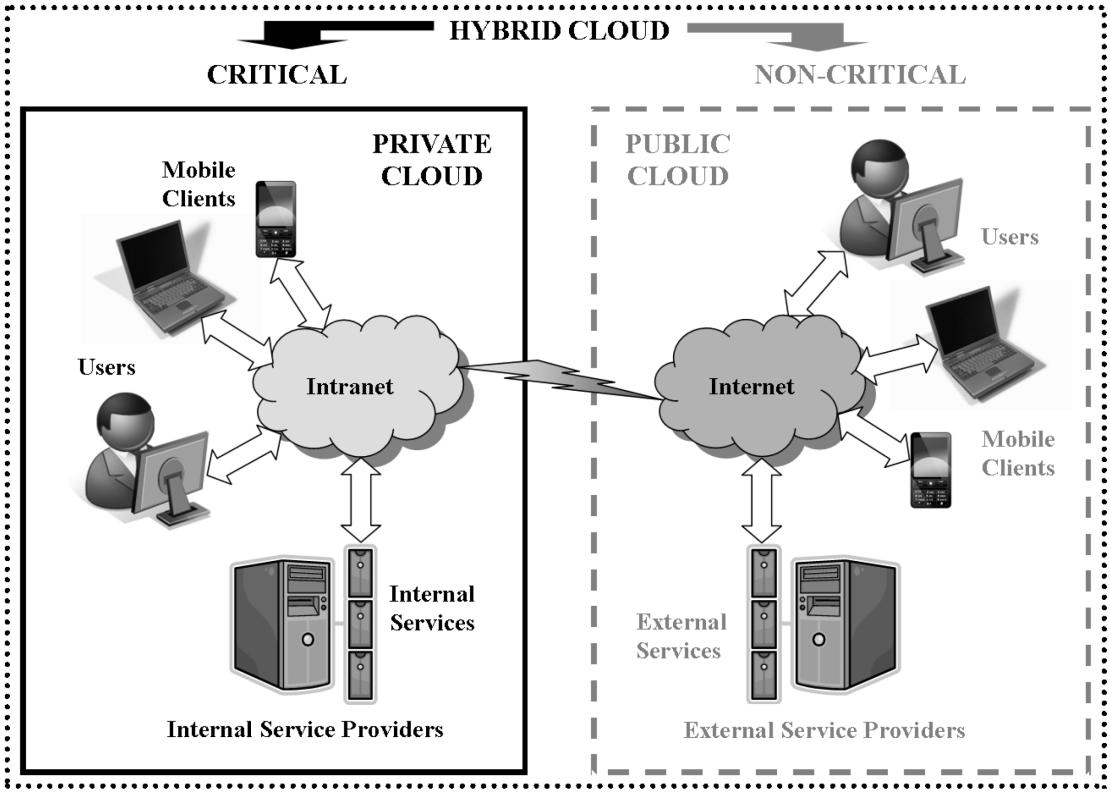
Resources in cloud computing systems are often provided on-demand (Goscinski and Brock, 2010). Both hardware and software resources can be dynamically allocated depending on varying needs of application services or users. Providers impose allocation limits with respect to their capabilities or contractual agreements. In-house cloud-based systems are closely tailored to the needs of organizations and their users. External providers are general-purpose oriented, since they serve various organizations and users with diverse demands. On-demand provisioning of resources permit flexible accounting. Organizations and users should pay only for the resources they used. This approach is beneficial in cases where there are significant fluctuations in use of resources.

There are three main models of cloud-based environments: private, public and hybrid. They are illustrated in Figure 1. All three models share the common features: resource distribution, accessibility via networks and on-demand provision. Distinctive characteristics relate to the ownership of provided information technology resources.

Private clouds refer to information technology environment where resources and services are owned by the organization that utilizes them (Orakwue, 2010). That is, all the infrastructure, hardware and services are in-house. The organization has its own information technology division that manages internal

infrastructure, hardware and software. Services are accessible within the organization via intranet. Access to information technology resources and services from outside the organization is optional. If the outside access is provided, it is usually via secure communication protocols. Services and resources are tailored the organizational needs and the organization has full control over them. This is the most secure model, but also the most expensive one. The organization must allocate financial and human resources to deployment, management and maintenance of utilized information technology resources and services. It requires greater initial costs and deployment time.

Figure 1: Illustration of Cloud-Based Models



Private cloud represents a model where information technology resources and services are contained within an organization and accessed via internal networks–such as intranet. In public cloud, services and resources are provided by external providers and accessed over internet. In hybrid cloud model, critical services and resources are provided internally and accessed via intranet, while non-critical ones are supplied by external providers and accessed over internet.

Public clouds relate to configuration where an organization does not own its core information technology resources and services and maintains only minimal setup. Information technology needs are outsourced (Hofmann and Woods, 2010). Outside providers own and provide services and resources required by the organization. They are not tailored to the needs of the organization and are general-purpose oriented, since the provider serves also other organizations. The organization does not have control over services and resources—the provider does. Services and resources are accessible over internet. Whether secure or insecure communication protocols are used is decided by the provider. This is the most insecure model, but the cheapest one. The organization may save the costs of deployment, management and maintenance of information technology resources and services.

Hybrid clouds pertain to a setup where an organization owns its core information technology resources and services. They are hosted and provided in-house. Non-critical services are outsourced to outside providers (Sotomayor et al., 2009). Critical resources and services are accessed internally via intranet,

while non-critical resources and services are accessed via internet. Critical services and resources are tailored to the organization's needs and the organization maintains full control over them. Provider has the control over non-critical services and resources. Hybrid cloud model represents a security-versus-cost compromise between private and public cloud models. The organization securely manages core resources and services, and saves costs by outsourcing non-core ones.

Categories of Cloud Services

Cloud computing services are broad. They range from hardware infrastructures, throughout software, to development platforms. Three major categories of cloud computing services are: infrastructure as a service, software as a service, and platform as a service.

Infrastructure as a Service (IaaS). Hardware and network infrastructures, together with related constituents, are provided as services. These may include complete computing hardware; such as computing servers or server clusters. Specific computing elements are targeted as well, such as Central Processing Unit (CPU) time of high-performance computing systems. Supercomputers are costly but fast. Thus, their CPU time can be provided as a service for computationally intensive applications and tasks. Data storage is another hardware related element. Data storage providers offer capacity for storing data and associated services such as backups. Bandwidth of high-speed networks is also utilized as an element of service; for instance, in video streaming for movie or television networks, in phone calls over networks, or in online video conferencing. The infrastructure and hardware services may be hosted in-house, or supplied by outside providers.

Software as a Service (SaaS). Functionalities of software systems are provided as on-demand services (SIIA, 2001). Large-scale software systems may be underutilized by individual divisions/users within an organization or costly. Hence, it may be more economical to share their functionalities. Spectrum of software services and related functionalities is broad. For instance, customer relation management systems, sales management systems, human resource management systems, content management systems, electronic commerce services, collaboration suits, office productivity suites, social networking services, e-mail services, etc. Benefits of SaaS adoptions are primarily associated with centralized management and maintenance of software. That is, security updates and patches, software upgrades and licenses are centrally managed. Users are provided with professionally managed and up-to-date software.

Platform as a Service (PaaS). Computing platforms and solutions are provided as services. Range of solutions in this domain is wide. They include facilities and tools for application design and development, testing, versioning, integration, deployment and hosting of applications, web service marshalling, security and persistence, state management, application instrumentation and developer community facilitation, etc. PaaS providers aim at enveloping the complete development lifecycle. Some aspects of application development are out of reach for individual or even organizational developers; for example, integration with third-party systems or large-scale testing. In such instances, PaaS providers have the ability to bridge the gap.

CLOUD RELATED CONCERNS

There are several significant concerns associated with cloud adoption. The majority of concerns are related to public clouds (Subashini and Kavitha, 2011; Lanois, 2010). Private clouds have the least number of issues. Three primary dimensions of concerns are outlined in Figure 2. They are concisely addressed in the following subsections.

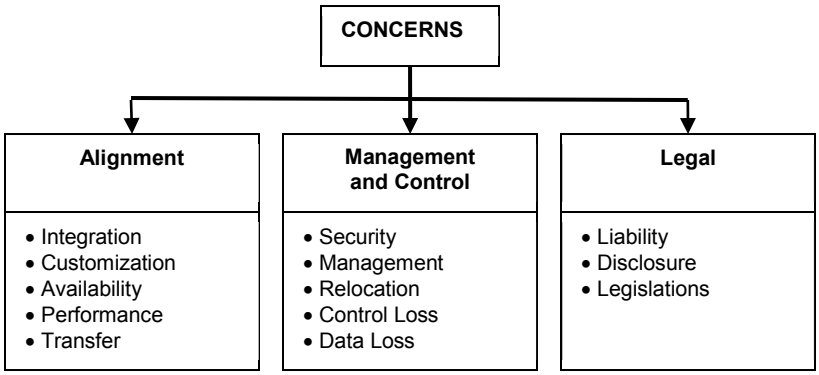
Alignment

It is important to align the organization's functional and operating model with the cloud-based model of utilization of information technology resources and services. Misalignments lead to decreased operating efficiency and losses for organizations. Following are several pertinent points for consideration.

Integration. Cloud-based services should easily integrate into information technology architecture of organization. They should be compatible with the existing formats, interfaces, and other structured data. If there are discrepancies, the integrating services should be provided.

Customization. Continual adjustments of services are important for meeting changing demands of users and organizations. Provided cloud-based services should be customizable at several levels to accommodate diverse needs. Without possibilities of customization, users and organizations may encounter substantial re-training and adjustment costs.

Figure 2: Three Essential Dimensions of Cloud Related Concerns



Three main dimensions of cloud related concerns are: alignment with existing operating model in organization, management and control of organizational data and services, and legal aspects.

Availability. Availability refers to readiness and accessibility of services. Cloud-based services are accessed via computer networks. Within organization, the access is provided via intranets, and outside organization via internet. It is important that high network reliability and readiness of services be provided. If the network is inaccessible, or services are not ready, users are unable to access critical services and data.

Performance. Scalability and performance of cloud-based services are closely related. Services should have satisfactory performance in order to accomplish the tasks users require. They should also be scalable to growing number of users. That is, performance of services should not decrease with growing user base. Several factors affect performance, however, the pertinent are network bandwidth, and computing resources allocated to services.

Transfer. Transferability of data and services should be easily manageable. It is necessary to consider transfers between intended cloud service providers as well as between providers and users. Organizations and users should avoid vendor lock-in. Complications during transfers between providers and backward to users could be costly and troublesome.

Management and Control

Management and control of data and services is one of the most important issues for organizations and users (Julisch and Hall, 2010; Hamlen et al., 2010). Public clouds pose the highest risk in terms of security and control. Private clouds enable full control of data and services as well as the greatest potential for security risk minimization. Following are the essential issues.

Security. Organization's data and services are among the most valuable assets. Moving your valuable data and services to outside providers poses essential security risks. The provider or other entities can compromise them. Accessing data and services over internet presents further risks. Internet transmissions propagate throughout various networks and are monitored and recorded by several third party organizations. Using secure communication protocols is crucial.

Management. Having potent managerial oversight over organization's data and utilized services is crucial. This should include data encryption, updates, deletes and backups. Data encryption is mandatory, in order to avoid possible compromization. When utilizing outside providers, it is important to properly manage actualizations between updates and backups. For instance, if sensitive data is deleted online, it remains on provider's servers and backups—where it can be compromised.

Relocation. Relocation of operations and secure move of organization's data back in-house or to different cloud provider should be fast and simple. Complications and delays in relocations and secure data moves may affect organization's operations and result in losses. Providers that do not allow secure, fast and simple relocations should be avoided.

Control Loss. Organizations and users should retain access control to their data and utilized services. Granular control of access privileges is desirable. In case of compromization, the control over data and services may be lost or transferred to other entities. Regaining the control should be fast and secure. Providers should maintain several layers of security.

Data Loss. Organization's data is a highly valuable asset. Data loss may have severe consequences. Despite reliabilities of backup systems, there is always a possibility of data loss or damage in cloud-based environments. Organizations and users should account for such possibilities and have adequate measures in place.

Legal

Legal aspects play important role in cloud computing. Relative novelty of cloud computing brings a number of legal challenges. The issues of liability, disclosure and legislative differences in various geographical regions are among the major ones to consider.

Liability. Cloud providers legally distance themselves from liabilities. Users of services offered by public cloud providers have limited or nonexistent legal protection. This presents significant challenges in important cases such as security compromization, data exposure, loss and damage. Nonexistent legal protection discourages adoption of services in public cloud environments.

Disclosure. Cloud providers are obligated to disclose data of organizations and users to certain government agencies and courts. This may happen even without notifying the affected organizations and users. Disclosure of sensitive economic data may harm organizations and negatively affect their competitiveness.

Legislations. Distributed nature of cloud computing model inevitably touches upon the issue of diverse legislations. Cloud-based services and data centers are distributed worldwide. When utilizing public

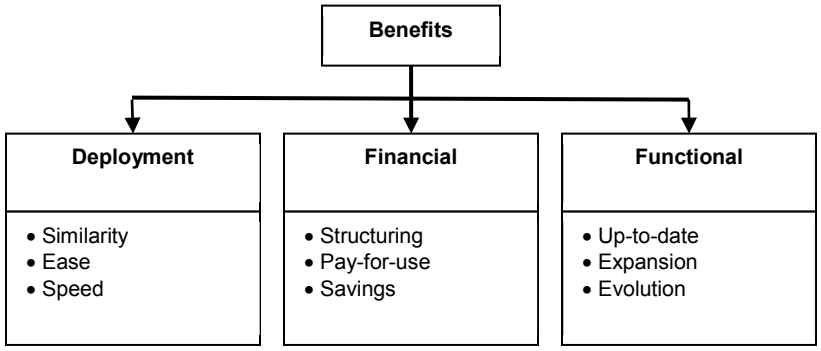
clouds, organization's valuable data may be distributed across geographical locations with inadequate or nonexistent legal protection and security.

CLOUD RELATED BENEFITS

There are benefits associated with cloud-based systems and services (Anthes, 2010). Organizations and users are primarily concerned about security and control. Security and control benefits are clearly associated with private cloud systems. The private clouds have also strong potential to avoid the most significant dangers. Employment of public cloud services significantly raises the security risks. One reason is the transmission of data over internet. Transmissions are monitored by several agencies and recorded by third parties. Thus, even if the organization uses encrypted communication protocols, third parties may intercept and compromise transmissions. Another reason is the loss of control over data and services on the side of public cloud providers.

Principal benefits of cloud-based systems are threefold: relative straightforwardness of deployment, financial flexibility and cost saving, and progressively managed functionality. Three benefit dimensions are depicted in Figure 3 and concisely described in the following subsections.

Figure 3: Three Fundamental Dimensions of Cloud Related Benefits



Three main dimensions of cloud related benefits are: deployment advantages, financial savings, and functional aspects.

Deployment

Deployment of cloud-based systems is becoming increasingly straightforward. Numerous advancements have been made on software level that facilitate virtualization and cloud adoption. All major operating system platforms provide high quality cloud solutions—both free and commercial. The main deployment process advantages are similarity to outsourcing, ease and speed.

Similarity. Deployment of cloud-based systems and services is similar to outsourcing. If organizations and their information technology managers have outsourcing experience and expertise, they are able to weight problems and benefits associated with cloud-based services. Information technology managers should be capable to ascertain which cloud-based model is the best suited for the needs of organization and its members.

Ease. On the technological side, deployment of both internal and external cloud-based services is relatively easy. This particularly holds in the case of outside providers. The providers specialize in cloud-based services. Hence, they have experience in easy adoption. However, this is generally valid for previously unused services. Transfer of existing services and data is more complex.

Speed. Deployment of cloud-based systems and services is relatively fast. There are numerous ready to use packages suiting various needs of organizations and users. Hardware and software solutions are modular. Modularity improves speed and ease of integration. Similarly, external cloud providers have a range of services available for immediate use.

Financial

Advantages of cloud-based systems in the financial domain are among the most pronounced. Cloud computing services have potential to decrease costs and increase flexibility of information technology investments in organizations. Major financial advantages include cost-structuring, payment for only utilized services and resources, and savings.

Structuring. Payments for cloud-based services may be segmented into several installments—depending on agreement with the provider (e.g. payments monthly, quarterly or semiannually). Structured payments for cloud services are beneficial for organizations that are unable to allocate the initial costs for private clouds. By employing external cloud services, they can spread the costs over longer periods. This also benefits short-term planning, since the near-future costs can be estimated more accurately.

Pay-for-Use. Cloud providers employ utility-style payment. Resources and services are segmented by providers into units according to various aspects; for instance, used data storage space, amount of processed data, or processing time. Users pay only for the resources and services they used. This permits scalability and estimates of costs with regard to amount of utilized resources and services.

Savings. Adopting cloud-based services may permit cost reductions. Organizations can reduce costs due to reductions of information technology personnel, costs of hardware and software infrastructures, and maintenance and management costs. Cloud computing model also allows better utilization of information technology resources.

Functional

Functional benefits of cloud-based services are linked to better-coordinated and centralized management. Although the services may be distributed, there is a dedicated team of information technology professionals managing them. Focused and dedicated information technology management brings up several functional benefits. Notable benefits include regular actualizations of services–in order to keep them up-to-date, expanding functionality and progressive evolution.

Up-to-Date. Software, hardware and infrastructure at the sites of cloud service providers are professionally managed and maintained. They are usually kept up-to-date. Required maintenance, updates and patches are professionally administered. Users are provided with the latest stable environments. This process is transparent to users, so they do not need to be concerned with such issues as patching the latest security holes or bug fixes.

Expansion. Cloud services are under continuous innovation by information technology professionals, in order to provide desired functionality. Cloud environments feature modular architectures. This permits expansion of functionality by implementing and deploying new modules. Cloud service providers can respond to needs of users relatively by deploying new modules.

Evolution. Progressive innovation and evolution of cloud-based environments is managed and executed by information technology professionals. They are well positioned to merge the latest technology advancements with the needs of users. Furthermore, they are capable of evolving cloud services according to progressive technology trends.

ACTIONABLE MANAGERIAL RECOMMENDATIONS

Significant considerations and planning should precede adoption and deployment of cloud-based services (McKinney, 2010). Managers should carefully weigh the associated risks and benefits (Marston et al., 2011). The previous sections highlighted the pertinent concerns and benefits. However, there are numerous other aspects to be considered by information technology managers and professionals (Haeberlen, 2010). Given the contemporary technological and legislative landscape, managers are advised to take into account the following actionable recommendations.

The best long-term strategy is to aim at the private clouds. Cloud computing services and infrastructure are kept in-house and provided internally. If there are excessive resources, or unused computing power, cloud related services could be provided to other organizations and users for adequate remuneration. Providing cloud services brings additional revenue to the organization. This is the model adopted by the largest providers. Private clouds have the best advantages in terms of security, control and availability. Valuable organization's data and services are all in-house. There is minimum exposure to outside entities; hence, there is a low risk of compromization by third parties. Implementation of appropriate in-house security measures is necessary. Furthermore, private clouds provide the greatest control over valuable data and services in the organization. Availability of services in private clouds is also significantly better. The access in private clouds is internal–via intranets. Intranets are notably more reliable than the present-day internet.

Hybrid clouds are the second best choice. In hybrid clouds, some services are hosted internally, while others are outsourced to external providers. Hybrid clouds allow balancing various aspects of cloud computing model and adjusting cloud adoption according to concerns and capabilities of organizations. Important issues are security, control and availability. It is essential to keep the mission critical services, data and infrastructure in-house. Non-critical services may be outsourced to external cloud providers. Hence, the organization shall maintain full control over its valuable services and data. There should be preserved strict separation between the core and the residual services and data. The separation should be preferably both physical and logical. That is, separate hardware and infrastructure is devoted to critical and non-critical services and data. Strict separation minimizes the risk of compromization by external entities. High availability of critical services and data should be provided by utilizing local intranets. Internet should be used only for accessing non-critical services and data, and secure communication protocols should be the standard.

Public clouds represent the least favourable alternative. In public cloud model, the organization utilizes external providers for both critical and non-critical services. It also stores organization's valuable data on provider's servers. Public clouds pose the highest risks and loss of control over organization's data and services. There is also significant risk of compromization by outside entities. The organizations employing public cloud services should have developed protocols addressing the issues of compromization, loss or damage to their data and services. Data should be kept in encrypted form at providers' servers and the organization should safeguard the encryption keys internally. Access to data and services should be via secure communication protocols. Legislative issues in public clouds play important role. Issues of liabilities and domiciles should be clearly stated. Data centres of providers may be located in regions with unfavourable legislations. Organizations should make sure that their data and services are hosted in regions with adequate legislative protection and enforceable rules.

CONCLUSIONS

Cloud computing does not institute a novel technological paradigm. It is a fusion of readily available technologies and enablers. Cloud-based services and technologies are associated with both benefits and risks. They should be approached with caution. The major risks are associated with public clouds.

Private clouds are the most beneficial. Information technology managers should carefully weigh advantages and disadvantages prior to adopting cloud computing model in their organizations.

The most important decision, after elucidating a number of factors, is the choice of cloud computing model. There are three main models: private, hybrid and public. Private clouds are in-house. The cloud infrastructure and services are hosted inside the organization and are owned by the organization. Public clouds signify the opposite of private clouds. The infrastructure and services are hosted and owned by external providers. Hybrid clouds feature the compromise between private and public models. Certain services are owned and provided within the organization, while others are owned and provided by external providers.

Understanding cloud computing risks and benefits is crucial. The greatest risks are security, loss of control, availability and legislative aspects. Security risks refer to the compromization of organization's data and services by outside entities. Loss of control is the inability to have exclusive control of data and services outside the organization. Availability underlines the readiness of services and data. It is largely affected by quality of connection between the access point and the service location. Internet connectivity is presently significantly less reliable than organizational intranets. Legislative aspects relate to liabilities and adequate legal protection of users. Notable benefits of cloud computing models are relative ease of deployment, cost savings and payments. Cloud computing services are designed for fast and easy deployment. By adopting cloud-based architectures, organizations can decrease costs related to staff, infrastructure, maintenance and management. On-demand services are aligned with utility-style payments—you pay for what you use.

Private clouds are the most beneficial in the long term. They feature the highest security, the greatest control and the best availability. However, private clouds may require higher initial costs. Public clouds are presently the most unfavorable. They pose the highest security risks, the lowest control and the greatest legislative gaps. Organizations should avoid reliance on public clouds. Hybrid clouds represent a compromise between risks and costs. Risks are minimized by keeping the critical data and services in-house—in private clouds. Costs are reduced by outsourcing non-critical services and data—to public cloud providers. Strict separation of critical and non-critical services and data should be preserved.

Hybrid clouds have promising future in diverse organizational environments. While large organizations have resources to implement private clouds, medium and small organizations may explore advantages of hybrid cloud systems. Hybrid clouds can balance risks and benefits. Unfortunately, there is a significant scarcity of hybrid cloud studies. Our future research will attempt to bridge this gap.

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ACKNOWLEDGEMENTS

The authors would like to thank the members of SITR laboratory at the National Institute of Advanced Industrial Science and Technology (AIST) for their valuable discussions and comments.

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PROPOSALS FOR THE IMPLEMENTATION AND IMPROVEMENT OF ISO 9001

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ABSTRACT

The ISO 9001 quality management system (QMS) includes a method of continuous improvement put in place in 1994. Through this system, audits and reviews are performed to identify, correct and prevent problems. Although the method of continuous improvement, combined with adherence to annual quality objectives, is an important part of the QMS, only a few business managers and quality professionals seem to acknowledge its significance. Whether the organization uses QMS or other improvement programs such as Six Sigma, Lean and TPM, it faces the same key question: how to ensure that methods that were beneficial during the execution of a project have continuity in the organization after the project has ended? One method of ensuring continuity is to apply QMS at the end of a project. Many organizations acquire and use ISO 9001 QMS in a limited way, for marketing purposes among other things, without taking a full advantage of its beneficial features. This paper analyzes various ways by which an organization can use the most beneficial characteristics of ISO 9001 QMS to improve its operations. The paper contributes to an ongoing discussion on the content and implementation of a quality system version related to ISO 9001 QMS, known as ISO 9001:2008. The paper proposes revisions that will make substantial improvements to ISO 9001:2008.

JEL: L20; L21; L23; M10; M11

KEYWORDS: ISO 9000, quality management system, performance improvement, process approach

INTRODUCTION

ISO 9001 QMS has been in use for more than 20 years and has become the most popular industrial standard with more than 1 million organizations using the technique. The suitability of ISO 9001 is therefore important for those organizations. If it is not suitable, they may invest time and energy into it without real positive impacts on their businesses. ISO 9001 is not immune to criticism. This paper discusses common arguments against ISO 9001 QMS and reviews their counter arguments. The literature review specific areas of quality and business management research issues. Two most important areas are tacit knowledge and process management. Several good features of ISO 9000 are identified and their ability to improve quality is discussed. By analyzing the present content and interpretations of ISO 9000, the author finds areas for improvement like the process approach. The paper closes with concluding comments about the present state of ISO 9001 standard.

LITERATURE REVIEW

The benefits and functionality of ISO 9001 quality management system has generated criticism from time to time. Curkovic and Pagell (1999) list some typical arguments against ISO 9000 like: the system is not directly connected to product quality, an organization does not need to demonstrate that its customers are satisfied, it is paper-driven and overly bureaucratic. Seddon (1998) identifies many examples of the harmful effects of ISO 9000: ISO 9000 makes things worse for their customers, ISO 9000 is inspection oriented and not development oriented, contract reviews have harmful effects, external auditors define quality and organizations do not achieve the promised results.

Symonds (1998), who serves as EHS (Environment, Health and Safety) Audit Manager in Mobil Corporation has responded to claims presented by Seddon. He presents two general observations. First, the people who criticize ISO 9000 are usually not directly involved in its implementation. Second, one should not blame the tool, if it is not used properly. These observations make sense in regard to all business systems, methods and tools. Thus, some companies achieve good results by implementing any well-known method while others, using the same tools, manage to only increase costs and frustration levels.

What explains the failure of some companies to use quality management tools for the benefit of the organization? Usually the root cause of failure can be found in the top and middle management who lack the skills needed for interpreting and implementing results obtained through QMS. Curiously, many researchers have overlooked this role of the management and focus on blaming or praising the methods.

When analyzing whether or not the organization has been successful in using information on best practices, the operational level of an organization also has a role. Harrington (1997) studied 60 organizations and analyzed the extent to which the best practices identified and implemented produced good results. His study showed that there were only five best practices (cycle-time analysis, process value analysis, process simplification, strategic planning and formal supplier certification programs), which always gave positive results regardless of performance level of a company: low, medium or high. In the end, Harrington concluded, it depends if management really understands the order their organization can proceed in developing its capabilities. There is no short cut into success. ISO 9001 base QMS can be easily adapted to the level of an organization, because the organization shall define quality criteria and procedural requirements based on its capabilities but still there remains room for lousy implementations.

Anderson, Daly and Johnson (1999) refer to several articles that indicate the 20 components of ISO 9000 are consistent with models of effective quality management system. The essential features of ISO 9000 are quality planning, goal setting, task authority assignments, adequate skills of staff, documenting process performance and responding to process failures. There is no scientific evidence that ISO 9000 contains elements which are harmful or dangerous in producing good quality. On the other hand it does not contain all the good characters of QMS. One good feature of ISO 9000 is that an organization can add any quality practice into their QMS (not conflicting with ISO 9000 principles) and it will be automatically part of certification. In practice almost all companies do this.

No system or method can replace human knowledge and know-how. QMS is a system for utilizing human knowledge in a systematic way. Some quality experts have learned from experience that systematic processes improvements (like Six Sigma and Lean) are possible only, if the QMS is good enough to eliminate the majority of human errors.

Tacit Knowledge

Since Polanyi (1996) introduced the concept of tacit knowledge, many studies have examined the meaning and nature of knowledge and the processes of creating and spreading it. Many researchers like Chen, Xu and Wang (2004) believe that tacit knowledge is more important that explicit knowledge in creating core competences. On the other hand there are many business philosophies that believe the opposite: tacit knowledge should be always transformed into explicit knowledge. The reason is that only explicit knowledge can be transferred between people (Kogut and Zander, 1992; Ollila, 2011).

Surely all quality philosophies including ISO 9000 argue for explicit knowledge in improving business performance. Commonly applied quality improvement methods like Six Sigma and Lean utilize documented means in analyzing and improving processes. In both methods improvements must be standardized and there must be documented evidence about results achieved. This is perfectly in line with

ISO 9000 which requires that essential procedures must be documented. When there is more than one person working in a process, it is impossible to train, to implement and to achieve evidence about the new way of working, if there is no documented material.

The basic idea of ISO 9000 is to document the best practice identified for a process or activity. Normally the improvements are achievements of systematic improvement. ISO 9001 (ISO 9001, 2008) has defined that continual improvement may happen "through the use of quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management reviews".

If a company has its own products, the R&D process and know-how is one of the most important assets of the company. Currently, R&D processes have been described quite well. The same is not true concerning the real know-how to develop new products. The author has experience with a company developing industrial products for more than 100 years. During the 1990's recession the senior product development engineers were fired. The new generation of design engineers started to develop new products – and engineering errors appeared in some design details, which had not happened earlier. The reason was the tacit knowledge, which disappeared from the company.

Some might consider this is evidence of the importance of tacit knowledge. How important it is to document tacit knowledge and especially the product development know-how? This know-how is normally something, which cannot be found in text books or in scientific articles. It is the combination of engineering skills, calculation methods, material know-how and lessons learned. Normally it flows from senior persons to junior persons. In the worst case this know-how disappears from the company to competitors with people transfers. If this know-how is documented, the damage is not so large. In many instances this most valuable know-how of a company is not documented properly.

Process Management

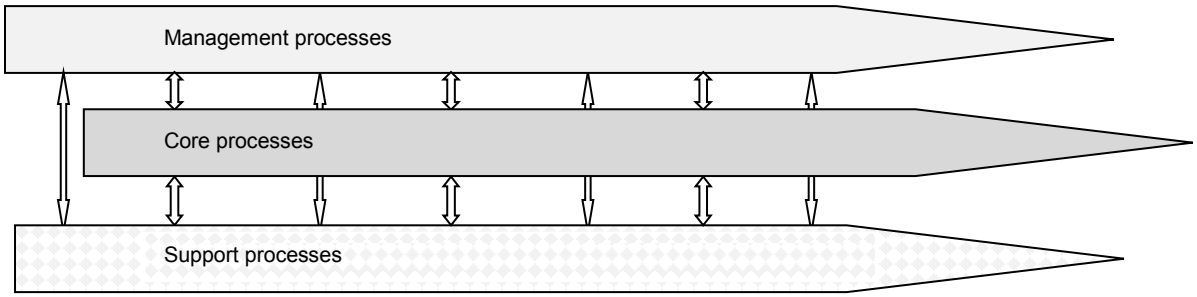
The literature reveals the ways organizations and researchers define processes. As Corallo & al. (2010) describe, the business process approach has been an actively discussed topic in the management literature since 1993. The review of some process oriented research indicates that researchers use different process definitions depending on the research angle as follows: Davenport (1993): operational and management processes, Johansson et al. (1993): core processes, Tinnilä (1995): core or key processes, supporting or non-strategic processes, Garvin (1998): work, behavioral and change processes, Rockart (1988): core processes, Lillrank (2003): standard, routine and non-routine processes, Galandere-Zile (2009): management, core and support processes, Corallo & al. (2010): management, core and support processes.

This literature review does not give a clear idea of the most common terminology. Because the process approach has been a business practice for about 20 years now, the terminology has become more consistent among companies. Also the presentation above indicates that during the most recent years, classification into three main categories is the most common solution as illustrated in Figure 1. In business improvements the core processes have a key role. For example Hammer, a specialist in process management, talks only about core processes (Hammer and Stanton, 1999), because there is major improvement potential. Kiraka and Manning (2005) have concern that organizations are facing difficulties in identifying their processes. The author has not experienced difficulties in process identification.

Lillrank (2003) explored quality as an outcome of standard, routine and non-routine processes. The definitions of his research can be summarized as follows: (1) Standard processes involve identical repetition of standardized tasks. Typical examples are mass manufacturers and high-volume service producers. (2) Routine processes are complicated, detailed and analytical processes within certain boundaries relying on existing knowledge, linear execution and predicable outcomes. A typical example

is an airline pilot making decisions about possible actions in various circumstances. (3) Non-routine processes are so complicated that the input variety is larger than the bounded rationality or experience set employed by the process. Typical examples are consultants and specialized doctors in health care. Lillrank and Liukko (2004) keep routine processes normally non-applicable for QMS.

Figure 1: The Most Common Classification of Business Processes



This figure illustrates the main process categories interacting with each other. The core processes begins from the external customer needs and ends to the satisfied customers. Support processes have internal customers mainly in core processes. Management processes tie together all other processes setting strategies and targets and carrying out follow-up.

As an example, consider a typical engineering project. It falls mainly into the category of routine processes. Project organizations realize it is important to have written procedures. A green field project starts from a feasibility study and proceeds through basic design into detailed design. Only for detailed design can exact engineering standards can be defined like ASME. Activities inside the phases and steps are based on the achieved experiences. The predefined execution of these processes is important in controlling quality. The majority of design solutions must be specified during the project execution. In this sense projects are typically routine. In some engineering solutions so much special engineering expertise is required that the most senior person must be involved utilizing their extensive experience. This implies a non-routine process. These situations are documented in written procedures, providing a proper guidance in achieving the best possible result.

Certification

The need for QMS certification for an organization is based on real need. Before certification important material suppliers and sub-contracting companies learned that their customers wanted to audit their QMS performance. The number of audits increased and some companies experienced customer audits every week. The same issues were audited again and again. Certification means that a neutral certification body carries out external audits and customers no longer need to audit. The number of certified companies has increased rapidly because it is in many cases a customer requirement. The message is that we shall not audit because the certification body will do it. Some companies have acquired the ISO 9001 certificate even though they operate in consumer business. This is an exception and usually related to improving the image of the company.

Because a reason for certification is a customer requirement, companies seek the certification in order to indicate fulfillment of regulatory requirements but not to improve quality. Anderson, Daly and Johnson (1999) carried out research with a sample of 514 certified public companies in USA. The results showed that the majority of companies (about 80 %) did not seek the certification primarily in response to regulatory requirements but to develop effective quality management practices. This result is in line with the research of Ollila (1995) who used customer satisfaction surveys and noted 8 of 10 certified ISO 9000 companies in Finland had improved quality as perceived by customers after ISO 9000 implementation.

REVIEW OF ISO 9000

In this section we pinpoint some features, which are useful in ISO 9000 and they are not usually part of any other quality philosophy or recognize areas of improvement. *Product quality:* It is true that ISO 9000 does not define product quality. Every organization must define quality in its quality documentation. The defined quality should be produced even though a customer does not specify any quality level.

Customer Satisfaction: Customer satisfaction is the first principle of ISO 9000. In his dissertation work Ollila (1995) carried out a survey of applied quality tools among 143 Finnish quality companies (94 % ISO 9000 certified). It turned out that customer satisfaction measurement was the most popular quality tool with a 90% implementation rate. In practice, ISO 9001 requires that customer satisfaction shall be measured. This is an addition for many organizations, because they normally had no customer surveys in place.

Documentation Requirements and Tacit Knowledge: ISO 9001 QMS means more paper work in an organization. The reputation for unnecessary paper work to a great extent comes from the early 90's. Quality managers asked each other "how many meters of quality documents do you have?" Companies documented their work procedures which were well-known to any professional person. This was a general miss-interpretation of ISO 9001 requirements. The latest ISO 9001:2008 version requires only six documented procedures (ISO 9001, 2008b). This change may have been a result of the unnecessary paperwork criticism. In reality much more is needed and applied in a typical certified company. As noted earlier, documentation is the only way to make tacit knowledge tangible, and is a positive feature of ISO 9000.

There are two ways to carry out improvements concerning planning and documentation activities. Some people believe in "trial and error". First we try and, if it works, we will document it, train and implement on a larger scale. This may be justified, if a change is small. Another argument is that "well-planned is half done". Well-planned means that it is documented because then it can be discussed and further developed. A team discussion without using documentation is ineffective as it is hot air created by speaking. By the terms of QMS it is better to document change first and then train and implement. A rule of thumb in ISO 9001 is that even a big change in a process or activity should be fully implemented after 6 to 12 months from its documentation.

External Auditors and Definition of Quality: Some ISO 9000 outsiders think it is external quality auditors that define the quality of a certified ISO 9000 company. The auditors simply try to find out, if an organization has defined the quality of its products or services in measureable terms and if the organization has evidence how well it can reach the quality criteria.

Contract Reviews: Even though the term "contract review" is not the official terminology of ISO 9001, it is a good expression about one of the most useful features in ensuring quality deliveries of a company. When people talk about quality, they normally have visualization that quality problems have been created in a production phase. If a product is more complicated than a standard product, the big quality problems are usually created in the order specification phase. The author's experience is that 80 % of major quality problems occur in the contract phase. If the customer is not able to specify the product in detail and the supplier does not know what is really needed, problems will ensue.

ISO 9001 requires that the organization shall review requirements related to the product (ISO 9001, 2008). The reason is well established: the organization must be sure the of product quality before committing to the customer. In practice this means the review shall be carried out for each bid, order and contract change. The type of review should be specified according to the nature of delivery. A standard product needs only an approved price list, a complicated product with options needs to be checked by a

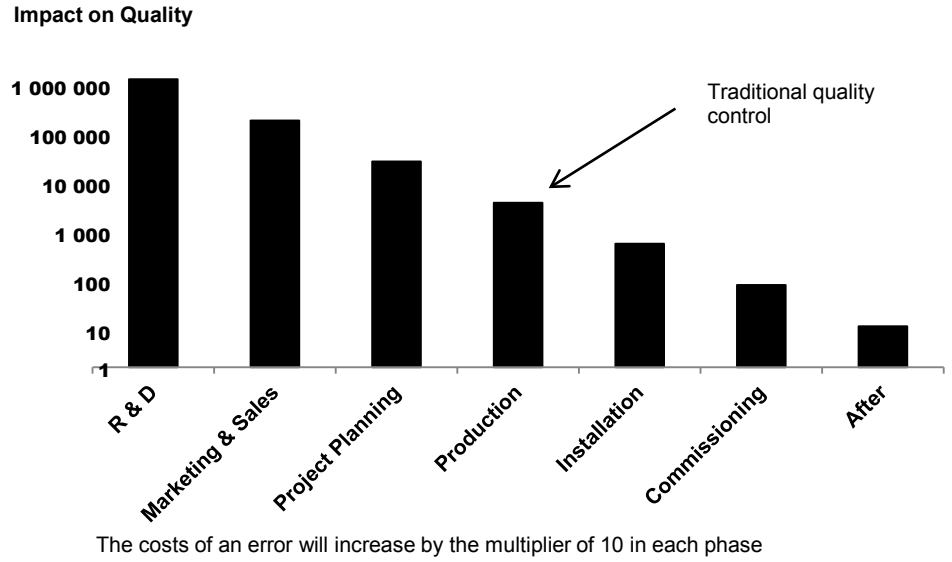
senior person. A review meeting is needed in some cases, when one person does not have all the knowledge needed to ensure quality. Project type activities always need a review meeting.

Figure 2 shows an illustration of a quality error. There is a common experience about the project work. An error created in a certain project phase is 10 times more expensive to correct in the next phase. The same applies into quality errors in any customer delivery processes. Phases described in Figure 2 are not always existing with making things easier. Project type activities are very demanding because they are a complicated series of activities and because a project is always a unique performance. In one istance the wrong electronic component choice in the R&D phase flowed through into customer deliveries and a one dollar error grew into multimillion dollar losses.

Organizations have a tendency to avoid contract review meetings sometimes with painful results. But on the other hand when in a review meeting an experienced person can bring forth a concern, which would have been otherwise neglected.

Audits: Internal audits are important in ensuring that QMS is working as planned. The major lessons learned are: A qualified auditor can find deviations from documented procedures in any organization. Second, the famous Pareto rule applies to deviations: 80% of cases should be corrected by following the documented procedure and 20% of cases the documented procedure should be modified according to the identified practice. This 20% of cases means that a piece of the organization or even an individual person has created a practice (outside of the system), which is better than the official way of working. Therefore it is essential to always receive evaluation from the process/activity owner regarding the corrective actions for each deviation. Sometimes it is a change in a procedure. A sign of a badly functioning process is many audit deviations from year to year. Third, the simplest indication of the quality culture of an organization is the promptness of corrective actions. In a good quality culture the deviations shall be swiftly corrected. In a lousy quality culture there are unnecessary delays in corrections. In the worst case the responsible person of a corrective action may even report the deviation has been corrected when it has not and it appears in a following audit. As always this means that the top and middle management has no real commitment for quality.

Figure 2: The Cost of an Quality Error from Phase to Phase



This figure illustrates that an error's impact will increase with logarithmic steps from phase to phase, if it cannot be removed. This figure illustrates the importance of the initial phases of any business activities.

The Quality of Measuring Equipment: For many companies implementing ISO 9000 for the first time, maintaining the accuracy and quality of measuring equipment in a systematic way, is something totally new. In some cases an organization has found the accuracies of measurement equipment is not sufficient to achieve the quality of the end product.

Maintenance of the Infrastructure: ISO 9001 defines how the necessary infrastructure shall be determined, provided and maintained. Modern production is not possible without production machinery and the quality of machinery has direct impact on the product quality. Ollila and Malmipuro (1999) show that poor maintenance in among the three main reasons of production quality problems.

Process Approach of ISO 9000: The process approach of ISO 9001 was introduced in version 2000. It was to be a major change. The introduction of version 2008 (ISO 9001, 2008) gives a positive idea about the general definitions being in line with general process terminology and requirements. For example a process means starting from customer requirements and ending to customer satisfaction. Also chapter 4.1 defines strict requirements for processes like: determination of processes and their interactions, criteria and methods for effective control of processes, monitoring, measuring and analyzing processes. There is confusion and problems concerning these strict requirements. If these requirements would be followed, the required evidence would not be available for the majority of certified companies for many years. Certification bodies require evidence of quality award assessments. Control of processes does not mean that there is a pair of key figures calculated for the outcome of a process. As quality professionals know, quality is not under control if you inspect the quality at the end of the production line as was practiced 70 years ago. Control of processes means other criteria than quality measurement: throughput time control, inventory control, smooth work flow, etc. Lean philosophy opens the doors for the effective process control.

When ISO 9000 introduced the process approach in 2000, it presented a big challenge for certified companies. Janas and Luczak (2002) surveyed 160 certified (ISO 9001) German companies and asked if they shall face problems because of the new requirements. The companies indicated no problems, because they already fulfilled the new requirements.

ISO 9001 does not classify processes in any terminology presented in the literature section. In paragraph 4.1 (ISO 9001, 2008) there is an expression that "The organization shall determine the processes needed for the *quality management system"*. Later requirements for processes have been addressed for QMS processes. This is confusing, because QMS is not even a core process. Janas and Luczak (2002) describe the new ISO 9001:2000 requirements as a description of work processes. There is common understanding among certification bodies and ISO appliers that the ISO 9001 terminology is misleading.

RECOMMENDATIONS FOR IMPROVEMENT

The following items are the author's recommendations for concrete improvements of ISO 9000. *Process Approach:* As a solution for process approach ISO should follow the most common practice of process terminology and use process classification into three main categories: management, core and support processes.

A smaller problem is that process mapping (flowcharting) is not an ISO 9001 requirement. In this respect ISO 9001 lags behind common business practice. The ISO 9001:2008 introduction indicates a core process starts from the customer and ends with the customer. It is crucial in process approaches that we consider business processes as a long chain of phases (stages) and steps. In contradiction with this approach is the introduction statement of ISO 9001:2008 that "Often the output from one process directly forms the input to the next". In properly done process identification this will not happen or it is very rare. Well-defined processes are from customer to customer – external or internal. There are interactions

between processes, which is another phenomenon. This same confusion can be found in one popular flowchart application: a process step symbol has also been called a process. This is as confusing as calling a machine part a machine. There are some examples of companies that have renamed old functional departments to be called processes. This is convenient, because you need not to change anything else, but you do not get any improvements either!

The author's opinion is that standard and routine processes can be documented and therefore also routine processes should be part of ISO 9000 QMS. The criteria of non-routine processes cannot be described in QMS but it is useful to document the process steps and actions. Tacit knowledge included in non-routine processes gradually becomes common knowledge and one day can be classified as routine and explicit knowledge fully included into QMS.

Review Terminology: Indefinite terminology of ISO 9001 causes problems for implementation of the standard. This may create disputes inside an organization. Moreover, auditors of a certification body may have different opinions of the real requirements of ISO 9001. In a few cases a procedure itself is not well-defined and has created criticism among the quality experts. The unclear terminology and content of requirements make both internal and external auditing difficult.

The word "review" has been used in different meanings (ISO 9001). Table 1, lists identified problems and proposed solutions for avoiding ambiguous meanings of the review word. The expression "review meeting" can be simply replaced by the term "review" if the review always means that a meeting must be organized. This needs to be clarified in the ISO 9001 description.

Corrective Actions: Some quality experts criticize the content of the chapter that a real cause for each nonconformity must be found. In mass production this is not possible. The text should describe each *special cause* must be identified but *system causes* can be analyzed utilizing methods specified by an organization. In many organizations these two categories of causes have not been identified even though it is crucial in analyzing quality nonconformities according to Deming (1986).

Table 1: Identified Problems and Proposed Solutions

ISO 9001	Original expression and a potential problem	Proposal
4.2.3	Control of documents: Review of documents in the meaning that the documentation is comprehensive enough and up-to-date.	This review activity of documents can be replaced by the expression "to supervise documents".
5.6	Management review: A management meeting has to be organized for reviewing the QMS at least once a year.	This review means a review meeting and it is the real and important requirement for the QMS maintenance and improvement.
7.2.2	Review of requirements related to the products (contract review): The requirements are unclear, because the same procedure is not suitable for a contract of a standard product costing 10 $ or a complicated project costing 100 M$.	This requirement can be replaced by the expression of "Checking and reviewing". The checking procedure is a good enough practice for standard products. A real review meeting is needed for complicated products and projects. An organization has to define the criteria for different types of contract procedures.
7.3.4	Design and development review: This review should be a review meeting but sometimes an organization wants to carry out this review as a document checking activity carried out by individual persons.	These reviews should be organized as review meetings, because that is the only way in identifying potential problems and in finding out solutions for the problems normally laying on the borderlines of different design disciplines.
7.5.2	Validation of processes for production and service provision: The first step is "Defined criteria for review and approval of the processes".	The word "review" is not needed at all, because the word "approval" is a good expression for this activity.
8.5.2	Corrective action: Reviewing nonconformities in the meaning that nonconformities are collated and analyzed and reviewing the effectiveness of the corrective action taken.	Reviewing nonconformities can be replaced by the terms of "Collating and analyzing nonconformities". The latter reviewing activity can be replaced by the expression "ensuring the effectiveness", because that is the real content of the activity.

Preventive Actions: The preventive action chapter should be removed from ISO 9001. There is little evidence that this is needed or that it is really applicable. In a majority of certified companies there is not

a single case. The very nature of ISO 9000 QMS has been designed to prevent nonconformities: planning, document checking, contract reviews, design reviews, product quality control, maintenance of processes, etc.

Internal Audits: Many companies utilize unqualified internal auditors. There might be a large pool of trained auditors but they may carry out only 0-2 audits annually. This kind of auditor is almost incompetent. This practice has been justified on the basis that the auditors will benchmark and will learn something good from other departments. The audited activity is not normally any benchmarking case. Benchmarking is a very different process. The results of audits could be sorted out and the real best internal practices should be identified and spread to other departments and processes. Stricter requirements for internal auditors are needed in order to improve the quality of internal audits.

Quality of Certification: The real problem in certification is that the quality of certification varies. There is no scientific evidence to support this contention but experience with three certification bodies suggests this is the case. Variation is mainly due to skills and attitudes of individual auditors. An auditor may put unnecessary high demands on small details but big deficiencies do not receive sufficient attention. Sometimes auditors want to please the customer by not being too demanding. Of course there are cases where a customer wants to change an auditor for these reasons. The real problem is that customers of certified companies shall find the certification process produces too much variation. ISO organization should put more attention for controlling the quality of external auditors.

CONCLUDING COMMENTS

The goal of this paper was to analyze the state of ISO 9000 standards against the common business management principles and to identify positive features as well the improvement items. The methodology has been to study research articles related to issues which have major roles in the performance of any QMS. The paper references the findings of some research articles in order to identify the grounds for keeping the positive features of ISO 9000 or to improve some features. Some research findings based on hisown experiences during 20 years of quality management are presented. The paper analyzes the general criticism for ISO 9000 QMS and found no good evidence for these allocations. ISO 9000 is still a very good basis for QMS containing all the major properties. A common mistake is to blame the tool, when management is not capable in applying the system. The good features of ISO 9001 QMS in improving the performance of an organization have been summarized: common elements for good QMS, contract reviews, turning tacit knowledge into explicit knowledge, internal and external audits and the control of quality of production machinery and equipment.

Even though 90% of the ISO 9001 content is up-to-date, there are some improvement items: process definitions and requirements, review terminology, auditor requirements, content of corrective actions and deletion of the preventive actions. Also the certification process produces fluctuations partly because of poor control of external auditors and partly because of ISO 9001 definitions and requirements.

The limitations of this paper come from the nature of this study. It contains many proposals. The positive and negative features are based both on theoretical grounds and on experiences of the author. Some improvement proposals are based on common practices in business. In those cases ISO 9000 should simply be updated to follow the best practices. The ISO organization has a way to update its standards and hopefully it can do it in a timely way.

Future research could identify differences in the business results of organizations which follow the improved practices as described here. The organizations could be compared to organizations following the present standard requirements. Because the proposed improvements are in many cases already

followed by some forerunning companies, this would not be too difficult. The need changes in ISO 9000 terminology could be identified by a survey of quality managers.

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ACKNOWLEDGEMENT

The author wants to thank PhD. Maija Härkönen for her checking of the English language and valuable comments on the content.

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SMALL- AND MEDIUM-SIZED ENTERPRISES: DATA SOURCES IN AUSTRALIA

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ABSTRACT

Small- and medium-sized enterprises constitute a significant sector in any economy. Academic research studies, which analyze various dimensions of small- and medium-sized sector in Australia, reiterate the importance of availability and reliability of data sources regarding these firms. Any research study has to be supported with reliable data sources that provide comprehensive, consistent and timely information, enhancing the significance of research results. This article provides information on eleven data sources for conducting a research on small- and medium-sized enterprises in Australia. The main aim of this article is to support the continuance of research in this crucial business sector. The data presented in this article provides vital information for researchers interested in conducting studies on different aspects of small- and medium-sized enterprise sector.

JEL: M15, C80

KEYWORDS: small business, SMEs, data sources, research in Australia.

INTRODUCTION

Since the early 1970s, activity in small- and medium-sized enterprise (SME) research in Australia has increased greatly (Johnson & Kells, 1997). Most Research studies concentrate on management issues (Wiesner, McDonald, & Banham, 2007), tax regulations (Chittenden, Kauser, & Poutziouris, 2003), industry (Johnsen & McMahon, 2005), performance (McMahon, 2001), export/import (Styles & Ambler, 2000), innovation and entrepreneurship (Parker, 2006), information technology (MacGregor & Vrazalic, 2008), failure of SMEs (Berryman, 1983), liquidity (Drever & Hutchinson, 2007) and financing arrangements (Watson, 2006b). However, there are still many opportunities for advancing research on Australian SMEs. For instance, there is generally a shortage of broad, in depth and comprehensive analysis about the SME banking market in Australia (KPMG, 2003). According to Drever (2006), it is essential to verify the awareness of the range of financing sources available to SMEs and identify gaps in the current credit management arrangements for Australian SMEs. McMahon (2001) also reported it was vital to include a wider range of industries when studying SMEs financial behavior. Watson's (2006a) work concerning SMEs external funding and growth, stated that there were limited studies on growing entrepreneurial SMEs in Australia.

Any research study must be supported with data sources that provide comprehensive consistent and timely information which enhances the significance of research results. This article provides essential information on SME data sources in Australia. In addition, it makes a contribution to existing academic literature and provides current information on SME data sources in Australia. The article is organized as follows. First, a literature review is presented. This is followed by a discussion of the methodology and results. The paper closes with some conclusions, a summary of the findings, and directions for a future research.

LITERATURE REVIEW

Overall, small- and medium-sized enterprises constitute a significant sector in any economy. It is vital to understand what differentiates SMEs from other enterprises. There are various characteristics incorporated in SME definitions. These include turnover, assets, employment numbers, and management characteristics (Lee & McGuiggan, 2008). In some industry sectors, such as, agriculture or crafts, SMEs play a dominant role, whereas in others, such as financial institutions or communications, their importance is smaller (Korcsmaros, Takacs, & Dowers, 2003). A small- and medium-sized enterprise definition has been considered by several researchers (Berryman, 1983; Drever, 2006; Wiesner, et al., 2007). The lack of a formal definition of a SME has led to different approaches followed by governments and other organizations in various economies (MacGregor & Vrazalic, 2008).

In Australia, there is no common definition adopted for small-sized enterprise (KPMG, 2003), and for medium-sized enterprise (Richard McMahon, 2001). In the early 1970s the definition of a small enterprise was articulated in 'economic' and 'statistical' terms (Drever, 2006). In early research of the performance and difficulties of small businesses by the Wiltshire Committee (1971), a small business is defined as one in which one or two individuals are required to make all important management decisions. This includes finance, accounting, personnel, purchasing, processing or servicing, marketing, selling, without the help of internal professionals and with particular understanding in only one or two functional areas. This early definition highlights the distinctive characteristics of a small business principal decision making and close control of operating activities by an owner-manager.

The Reserve Bank of Australia (RBA) (2001) also supported the notion that a business was generally regarded as small if it was independently owned and operated, and was closely controlled by owners/managers who contributed most, if not all, the operating capital. RBA also distinguished small businesses on additional parameters (Reserve Bank of Australia, 2010). For instance, unincorporated type of legal structure was assumed to be attributable to small business. Another parameter was the size of loans, where small businesses were generally provided loans of less than $2 million. The majority of banks tended to segment their business banking customers based on a definition that had a combination of turnover, loan-size and total amount of loans and deposits with the bank (KPMG, 2003).

The Australian Bankers' Association uses the following definition, which is included in its Code of Banking Practice (2003, p. 25): *"small business means a business having: less than 100 full time (or equivalent) people if the business is or includes the manufacture of goods; or in any other case, less than 20 full time, or equivalent people." The* Australian Bureau of Statistics (ABS)'s (2009a) definition of small and medium enterprises follows a more detailed approach. They define SME as follows *"non-employing businesses — sole proprietorships and partnerships without employees; micro businesses — businesses employing less than 5 people, including non-employing businesses; other small businesses — businesses employing 5 or more people, but less than 20 people; medium businesses — businesses employing 20 or more people, but less than 200 people."* The common theme in these definitions is that SMEs collectively have an essential impact on employment, economic stability, business development, human resource management and overall SME sector viability.

This concept was also supported by the Asia Pacific Economic Cooperation Council (2003), as SMEs play critical roles in providing job opportunities, enhancing the quality of human resources, promoting a culture of entrepreneurship and new business opportunities. The performance of all companies, regardless of size, is affected by the business environment in which they operate. SMEs are a key component of future economic growth in developed, emerging and also developing countries (Korcsmaros, et al., 2003). In the European Union small enterprises provide jobs for 70 million people and account for two-thirds of

total employment. In Japan, small enterprises account for 78 percent of employment; and for over half of private sector workers in the United States (cited in Korcsmaros et al. (2003))

Small businesses are the largest collective private sector employer in Australia. As large firms in the developed economies downsize and outsource some functions, the proportion and importance of SMEs increases (Korcsmaros, et al., 2003). Small enterprises provide employment opportunities and thus contribute to economic stability thereby maintain training levels to avoid a future skill shortage (Council of Small Business in Australia, 2009). The Australian Chamber of Commerce and Industry (ACCI, 2011a) reported that competitive and entrepreneurial strength of small enterprise was crucial for sustaining Australia's economic future as the level of growth in larger enterprises had been steadied, with restructuring more in favor of medium and smaller enterprises and the utilization of professional skills.

The SME sector in Australia offers the potential for research opportunities to advance knowledge about this significant business sector. Certain characteristics of small enterprises mean that they demand special research treatment (Johnson & Kells, 1997). SMEs are usually more credit constrained than larger enterprises in the economy due to financial sector policy distortions and lack of know-how on the part of banks (World Bank, 2004c). Drever (2006) argued that financial problems (lack of funds) constrained the development and growth of SMEs, as many SMEs are unable to access the same kinds of growth funding often available to large enterprises (Watson, 2006a). One of the principal findings in the research studies conducted by Keasey & Watson (1993), Storey (1994) and Timmons (1978), was that small enterprise sector exhibited a greater propensity to fail than bigger enterprises. Further according to a KPMG (2003) report, smaller enterprises in comparison to larger ones, were generally subject to higher interest rates on credit, due to their high failure rates.

Previous research on Australian SMEs had specified the importance and availability of data for conducting more detailed studies on Australian SMEs (Cassar & Holmes, 2003; Drever, 2006; Hawke, 2000; Johnson & Kells, 1997). Acknowledging the considerable scope for improvement in small business data sources, both governments and private organization have increased the range of small business data available for researchers (Johnson & Kells, 1997). This article seeks to expand previous research studies (Hawke, 2000; Johnson & Kells, 1997) and includes updated information on SME data sources in Australia.

METHODOLOGY

Australian research studies were reviewed to identify sources of data on the SME sector. In addition, web portals of government agencies and private research organizations were reviewed to identify the possible data sources for conducting research on SMEs. Google Scholar, Google and Business Source/Business Source Complete research databases were used to find updated academic literature and other relevant publications that claimed to have information on SME sources in Australia. A limited number of academic studies provide such details. However, two earlier Australian academic studies conducted by Johnson and Kells (1997) and Hawke (2000) delivered information on small business data sources and on the importance of Australian Bureau of Statistics' business longitudinal survey for business research. As a result, this article provides updated information on eleven SME data sources in Australia.

RESULTS

Both government and private organizations have contributed to the increase in data on the SME sector available for researchers. Table 1 presents a summary of the SME data sources discussed in this research. All data sources listed in Table 1 included either qualitative or/and quantitative data for conducting a research on SMEs in Australia.

Australian Bureau of Statistics

The Business Longitudinal Survey (BLS) conducted by Australian Bureau of Statistics (ABS) is aimed at providing data on a wide range of business characteristics and behaviors and links these to performance over time. The latest BLS was released at the end of 2009 and contains data on businesses for the periods 2004-2005, 2005-2006, and 2006-2007 and is the largest data set on SMEs in Australia. The survey coverage is extremely broad offering many research opportunities. The main advantages of the BLS is it offers information about the SME sector, which cannot be obtained from other sources.

Table 1: Summary of SME Data Sources

	Name of organization	SME Data Source
1.	Australian Bureau of Statistics	✓
2.	Reserve Bank of Australia	✓
3.	Australian Chamber of Commerce	✓
4.	Council of Small Business Organizations of Australia	✓
5.	Australian Bankers' Association	✓
6.	IBIS	✓
7.	Dun & Bradstreet	✓
8.	KPMG	✓
9.	Sensis	✓
10.	CPA Australia	✓
11.	Canstar Cannex	✓

This table shows sources of data on Australian SMEs.

The BLS provides information on how to examine the impact of issues such as, exporting, innovation, business planning, different employment and financial structures, training, business networks and others have on business growth and performance (Australian Bureau of Statistics, 2009a). In addition, ABS (2009b) states the aim of the Business Longitudinal Database (BLD) is to produce a reliable longitudinal dataset of both characteristics and financial data that would allow analyses of changes in the performance of a cohort of small and medium businesses over time.

It is possible to obtain information from the BLS via a number of options. The ABS website (CURF), RADL (on-line, batch mode query system), ABS publications all include this information. A confidentialised unit record file (CURF) is a file of responses to an ABS statistical collection that has had specific identifying information about a person or organization removed (Australian Bureau of Statistics, 2009b). The RADL is an on-line, batch mode query system that supports access to ABS CURFs. Analysis of Basic and Expanded CURFs is enabled via the RADL. Due to the sensitivity of CURF data, there are restrictions on the output that can be released. Unfortunately graphical outputs are not available at this time. The latest BLD 2004-05, 2005-06 and 2006-07 CURF is only available as an expanded CURF, which is accessed via the RADL.

ABS (2009b) indicated that, the sample design involved use of panels that represented the Australian business population at the time each was initiated into the BLD. Panel one was representative of the in-scope business population as of 30 June 2005. Panel two was representative of the in-scope business population as of 30 June 2006. Each Panel is directly surveyed once a year for a period of five years. In the latest edition of the BLD CURF, Panel One contains three reference periods of data (2004-05, 2005-06 and 2006-07) and Panel Two contains two reference periods of data (2005-06 and 2006-07). According to ABS (2009b), some key data items on the BLD CURF include: (1) Business characteristics - industry division, business size (based on employment), number of locations; (2) Employment - total; full/part time; casuals; pay setting arrangements; (3) Basic financial indicators - value of sales and capital/non-capital purchases; (4) Innovation indicators - type and status of innovative activity; (5)

Information Technology indicators - use of Internet, web presence, Internet commerce; (6) Business financing - type, status and reasons for finance; (7) Barriers to business performance.

Reserve Bank of Australia

The Reserve Bank of Australia (RBA) conducts monetary policy, works to maintain a strong financial system, issues the nation's currency, manages Australia's gold and foreign exchange reserves, and provides selected banking and registry services to a range of Australian government agencies and to a number of overseas central banks and official institutions (Reserve Bank of Australia, 2011). In addition to these vital roles, RBA gives researchers access to an invaluable range of data files for various aspects of SME sector quantitative analysis. It offers extensive sets of statistical tables, charts, statistical releases, research discussion papers, financial stability reviews, submissions and inquiries on recent developments in the small business sector. These resources are available on RBA's official website.

Australian Chamber of Commerce

The Australian Chamber of Commerce (ACCI) is Australia's largest and most representative business association and the peak council of Australia's State and Territory Chambers of Commerce and major National Industry Associations. ACCI's focus is on the promotion of a world class environment for doing business in Australia, which encourages private sector investment, entrepreneurship and contributes to improved community living standards (ACCI, 2011b). In addition, ACCI is committed to producing the best policy and research to inform and influence the national public policy debates, policy makers and the community.

On its website ACCI has a wide range of high quality publications, research reports, small business economic surveys results, annual business reviews and submissions. ACCI commissions a comprehensive collection of economic surveys that provide information on the current state of the Australian economy (ACCI, 2011b). ACCI's surveys relevant to SME sector include: Commonwealth Bank ACCI Business Expectations Survey and ACCI Small Business Survey. In addition, as the national voice of Australian business, ACCI regularly makes submissions to the Australian Government and Parliamentary Committees on issues that affect all Australian business. Furthermore, ACCI releases issue papers and reports focussed on research that enhance understanding of the need for particular reforms or actions. Most if these data sources may be accessed on ACCI's website or by contacting ACCI directly.

The Council of Small Business Organizations of Australia

The Council of Small Business Organizations of Australia **(**COSBOA) is one of the Australia's vital bodies that exclusively represents interests of small businesses. One of COSBOA's main goals is to foster an increased awareness and understanding of the role of small business in Australia among government representatives, larger businesses, the media and the general community (COSBOA, 2011). It regularly makes contributions to research and inquiries to ensure that the concerns/opinions of small businesses in Australia are considered by decision and policy-makers. COSBOA recently conducted a survey on small business banking and finance in Australia, which was released on 23 April 2010. In total 173 businesses expressed their view on various dimensions of small business banking and finance (COSBOA, 2010). Coverage of the survey offered an opportunity to explore the data for the analysis of the small business banking in Australia. Data may be accessed via COSBOA's website or via electronic mail inquiry.

Australian Bankers' Association

The Australian Bankers' Association (ABA) traces its history to the late 1940s when a national organization was formed to oppose a Government proposal to nationalize the banking system (Australian Bankers' Association, 2011). Since then, it has taken on many roles and responsibilities on behalf of its membership, but the modern organization reflects major restructurings that occurred in 1985 and 1997. In the mid 1980s, it was determined that the ABA's role was too limited, and was broadened in favor of having a fully representative organization of all licensed banks in Australia (Australian Bankers' Association, 2011). A new constitution was drafted in 1985 to reflect a move towards an organization which represented the views of members to government, discussed policy issues, looked at matters that might increase the efficiency of the industry and conducted industrial relations and public relations (Australian Bankers' Association, 2011).

The ABA provides analysis, advice and advocacy and contributes to the development of public policy on banking and other financial services. The ABA works to ensure that banking industry views are put forward when governments determine policy or legislation. In addition, to these vital tasks, ABA also engages in active research on industry issues. One of the latest submissions made by ABA was to a Parliamentary Joint Committee on corporations and financial services access for small and medium-sized business to finance. The Australian Bankers' Association (ABA) noted that small businesses had a tough period throughout the global financial crisis and are still dealing with its impacts. Instable trading environments negatively impact small business revenues. Unfortunately, some small businesses have experienced cash flow problems, in some cases causing banks to decline loan applications because of the businesses' reduced ability to repay their loans. This information may be found on an ABA's official website and may provide a foundation for a research on the SME sector in Australia.

IBIS

IBIS provides independent, accurate, comprehensive, and up to date research on over 500 industries, including statistics, analysis and forecasts (IBISWorld, 2011). It also has reports on Australia's top 2000 companies and risk rating reports on every industry. IBIS' industry research reports offer the latest content on almost every Australian industry including new report titles on emerging industries. Each report consists of key statistics and analysis on market characteristics, operating conditions, current and historical performance, chart packs, forecast, major industry participants and more details relating to the SME sector. All information is available on the official IBIS' website.

Dun & Bradstreet

Dun & Bradstreet (D&B) has been the world's longest-established business and leading source of commercial information and insight on businesses for 167 years. D&B provides business, credit, receivables and marketing information. D&B's extensive international network enables it to get access to reliable and accessible information, updated 1.5 million times a day, on more than 150 million companies (Dun & Bradstreet, 2011). D&B has a detailed database, which provides quality business information, as it is the foundation for every business research. D&B's products and services include risk management systems, business information reports, credit rating, warning and monitoring systems, expert opinions as ordered, business guides and a selection of directories, marketing databases and more. The details of the reports are accessible through the official website.

KPMG

KPMG is the global network of professional services firm of KPMG International, that provides audit, tax and advisory services through industry focused, talented professionals who deliver significant benefit for their clients and communities (KPMG, 2011). KPMG also publishes reports on small businesses concerning various financial aspects, including business banking experience in Australia (KPMG, 2003). KPMG's bi-annual Mood of the Market Report survey engages a cross section of Australian private companies to assess current business sentiment and provides insight to market participants. All the latest publications are available on KPMG's website or may be obtained by contacting KPMG directly.

Sensis

The quarterly Sensis Business Index has been tracking SME confidence and behavior since 1995. It surveys 1,800 metropolitan and regional SMEs from areas such as, manufacturing, wholesale and retail trade, hospitality, construction, communication, property, business services, health, community services, cultural and recreational industries (Sensis, 2011). Its primary objectives are to measure overall SME confidence, track expectations over both the current three and 12-month periods and measure overall SME confidence. The secondary objective is to provide an independent, objective assessment of the experiences and attitudes of SMEs on key issues. Sensis offers all the latest information on its website.

CPA Australia

CPA Australia is one of the world's largest accounting bodies with a membership of more than 129,000 finance, accounting and business professionals across the globe. CPA's core services include education, training, technical support and advocacy (CPA Australia, 2011). CPA Australia recognises the importance of the small business sector. Through the survey program, CPA provides research to inform the decisions of small business owners, advisers to small business and policy makers. Conducted bi-annually, the survey program investigates issues of major importance to the small business sector. Previous surveys include risk, compliance burdens, employment issues and small business succession and exits (CPA Australia, 2011). A recent submissions raised questions on access of small business to finance. This submission was directed to the Senate Economics References Committee. The details of the publications and research reports are accessible online.

Canstar Cannex

Canstar Cannex takes pride in providing fact-based data and ratings to Australian retail, business consumers and financial institutions. It also offers coverage on small business banking and agribusiness. Initially, Canstar Cannex concentrated on providing details on interest rates, but now its research features include, service, claims experience, innovation and customer satisfaction, with all the research methodologies made public. Canstar Cannex gives access to information that compares interest rates and star ratings for loans, cards, accounts, insurance, investing, savings accounts, term deposits, car insurance, home and contents insurance, life insurance, health insurance and superannuation. Canster Cannex has a research library, which allows individuals to search by product type, year of a release, or company name on a collection of products and services (Canstar Cannex, 2011).

CONCLUSION

SMEs collectively have an important impact on employment, economic stability, business development, human resource management and overall SME sector viability. The purpose of this article was to reiterate the importance of research in the SME sector and provide details on SME data sources. Australian

research studies were reviewed to identify sources of data on the SME sector. In addition, web portals of government agencies, private research organizations, Google Scholar, Business Source/Business Source Complete research databases were reviewed to identify data sources on the SME sector. An overview of the literature showed that research on some aspects, such as small business lending, development, credit management, growth, and cost of credit had been constrained by data availability, which provides an opportunity for future research. There has been an improvement in small business data sources, as both government and private organizations have increased the data collection on the SME sector. Eleven SME data sources in Australia were presented including government and private sources. This article extends the work of previous studies and includes updated information on SME data sources in Australia.

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THE IMPACT OF FINANCIAL DECISIONS AND STRATEGY ON SMALL BUSINESS COMPETITIVENESS

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ABSTRACT

This paper examines the financial decisions made by companies, the strategies that organizations follow, the alignment between these two variables, and the relationship of financial decisions to the level of competitiveness. Two hundred two businesses' testimonies in the region of Celaya were analyzed. The results show that most micro and small enterprises make funding decisions in a certain way, apply an intensive strategy, also that their market longevity is low and their level of sales is regular, implying that Mexican companies lack competitiveness, which hampers their development and expansion. The emphasis that companies place on certain financial decisions is not always appropriate for the type of business strategy being implemented. Likewise, companies that efficiently manage their short-term assets and liabilities are more competitive, as evaluated by their longevity on the market.

JEL: M10; G30

KEY WORDS: Small business, competitiveness, strategy, financial decisions

INTRODUCTION

The effect of financial decisions on business competitiveness is a topic that researcher have not yet studied in depth. Despite its importance and the need to adapt financial strategies to an organization's characteristics, few studies have focused on analyzing decision-making and its impact on small enterprises' competitiveness. A business's financial environment is a main factor for the organization's success, especially small businesses forced by financial limitation to be highly efficient in allocating their scarce resources in order to ensure survival and generate profits.

The importance of financial decisions in business is evident, since many of the factors that contribute to failure can be managed properly with strategies and financial decisions that drive growth and the organization's objectives. According to a number of studies (Ibarra, 1995; Van Auken and Howard, 1993) the main causes of business failure are the lack of financial planning, limited access to funding, lack of capital, unplanned growth, low strategic and financial projection, excessive fixed-asset investment and capital mismanagement. Many of these causes of failure are challenges that can be successfully managed with financial strategies developed and implemented by the organization. However, the study of financial decisions has been, for a long time, limited to large corporations, about which extensive research has been published.One of the main features of small businesses is that they do not have useful financial information to make decisions. The information generated is utilized to pay taxes but does not reflect the real situation of the organization. In addition, small businesses do not have specialized personnel with expertise for planning, administration and financial decision-making, and the owner has to make decisions without a solid foundation. Because small-business owners concentrate mainly on obtaining resources for operating expenses, it is difficult to develop financial plans: there is no knowledge of how to implement them, daily problems overwhelm entrepreneur decision-making and the urgency is to solve basic problems in order to generate income. However, this does not imply that financial decisions should not be based on financial planning. Small businesses' problems are very clear in Mexico. Sixty-five

percent of small businesses shut down in less than two years, while twenty-five percent survive during this period with a very low probability of development. Although small businesses do not struggle only in the financial area, it represents a central problem that affects their development.

This research paper aims to contribute to the existing knowledge in the field of small and medium sized enterprise (SME) management through the study of financial decisions, strategies and their impact on the development of SMEs. The objectives are: 1) to understand and analyze the major financial decisions made by SMEs; 2) to determine the relationship between financial decisions and the competitiveness level of SMEs; and 3) to analyze the alignment between SMEs' strategies and financial decisions.This document is organized into four sections. The first is an analysis of the literature on business competitiveness and financial decisions. The second section describes the methodology used in the study, specifying the variables used. The results are presented in the third section and the fourth draws overall conclusions.

LITERATURE REVIEW

Business Competitiveness

Although there is not just one conceptualization of competitiveness, several approaches make reference to multiple factors that in one way or another affect the competitive position of companies and/or entire sectors of production. According to the World Competitiveness Report there are three levels of competitiveness: a) Enterprise Competitiveness, which is defined as "the ability to design, produce and market goods and services that are more attractive than the competitors' benefits package" (Chauca, 2003: 30); b) Sector Competitiveness, which implies that a sector offers high returns on investment and is in a strong growth stage; and, c) National Competitiveness, defined as the ability of a nation to provide an economic, political, social and labor environment favorable to organizational development.

According to Porter (1987), competitiveness is the basis of national prosperity, which is determined by the macroeconomic, political, legal and social context, as well as the microeconomic context, i.e. the strategies implemented by individual organizations. A firm's competitiveness has important implications, positive or negative, for sectors and countries. "The success or failure of a company has an impact on the results of the entire industry; in turn, the firm's performance determines the competitiveness of regions and nations by influencing variables such as employment levels, the rate of economic growth, and ultimately, the level of well-being of people" (Arroyo and Berumen, 2003: p. 13).

However, although the competitiveness challenge lies in the corporate sector, where the company must build technological, marketing, management and human capital, as well as financial capabilities, the involvement of the government is also crucial for the development of business competitiveness. Governmental policies and institutional support help to develop enterprise competitiveness by generating a stable macroeconomic environment, establishing a strong export strategy, promoting the development of industrial clusters and providing efficient infrastructure, among other contributions.

Regarding enterprise competitiveness, Anda (1996) argues that the ability to remain in the environment is a signal that the organization is competitive; in other words, the firm has the ability to compete in a market. To this end, the company must develop various functions in their operational and strategic activity with quality and efficiency in order to be competitive.In this sense, Porter (1987) argues that competitive strategy generated by the organization is what determines business competitiveness, and that the choice of this strategy is based on the structure of the business sector where the organization competes and on the relative position that the organization has within that sector. This means that the strategies

implemented by an organization will determine its competitiveness, and they must be carefully selected to give the organization a competitive advantage.

Financial Decisions

One area that has received little attention in the establishment of strategies, especially in the study of micro, small and medium-sized enterprises, is that of financial decisions, even though it is a determinant of business competitiveness. Financial analysis and planning, which represent basic features that support organizational strategy, are nonetheless virtually non-existent in micro and small enterprises, which impose a constraint on the kind of financial decisions businesspeople can take.Financial strategy represents a path to achieve and maintain business competitiveness and position a company as a world-class organization. Financial strategies are goals, patterns or alternatives designed to improve and optimize financial management in order to achieve corporate results (López, 2006).

Financial strategy consists of three interrelated kinds of decisions: investment, funding and working-capital decisions (Ross, Westerfield & Jordan, 2000). Investment decisions relate to the allocation of capital to carry out investment opportunities that are valuable (bring value) to the company, taking into account the magnitude, opportunity and risk of the future cash flows of investment. Funding decisions concern the specific mix of long-term debt and capital that the company uses to finance its operations, i.e., optimal capital structure. Working-capital decisions include the management of short-term assets and liabilities in a way that ensures the adequacy of resources for company operations. Assuming the corporate aim is to maximize profits, it is important for businesses to seek the optimum combination of the three kinds of financial decisions.Mallette (2006) argues that an organization's financial strategy is so important to the company that it must be evaluated and adjusted as frequently as the operational strategy. He also says that the evaluation of financial strategies must be consistent with operations, needs and specificities of the business. The description of financial practices carried out by businesses represents an issue that has received more attention. Valencia et al. (2006) published a study of financial practices in Mexican firms taking into account the organizations' characteristics. They found that most enterprises establish an optimal leverage ratio, use investment evaluation techniques, have traditional management based on budgets and the Return on Investments (ROI), do not use techniques such as EVA or BSC, and apply financial ratios as a technique to analyze profitability.

Jog and Srivastava (1994) conducted a study that looked at financial decision-making processes that Canadian companies followed, as well as techniques they used to make decisions on capital budget, financing costs and sources, and dividends. Their results show that investment decisions are closely related to funding opportunities, and that the method used for the capital budget is the internal rate of return and the net present value. They also found that most Canadian companies determine an optimal debt and equity ratio. With regard to dividends decisions, present and future earnings represent the most relevant factors enterprises consider when deciding on dividend policy.

Another group of studies analyzed firms' use of certain financial analysis techniques. Lazaridis (2002) and Pohlman et. al. (1988) investigated the way in which companies generate information to calculate cash flow, finding a large number of companies using subjective methods to forecast cash flows and just a few companies adopting sophisticated techniques. Kamath (1997) studied long-term funding decisions in large corporations and found that most companies do not maintain an objective in their debt and equity structure, preferring a financial hierarchy. They also showed that the main issues in financing decisions are those related to maintaining financial flexibility and ensuring survival in the long term. Zopounidis and Doumpos (2002) examined a technique called "Multi-criteria decision Aid" (MCDA) that helps with financial decision-making, by evaluating aspects such as corporate performance, investment, financial problems and credit; the authors showed the advantages of this technique in financial decision-making.

Likewise, there has been research focused on the analysis of financial decisions and their impact on creating value for investors. Escalera and Herrera (2006) studied the relationship between financial decision-making and economic value creation in Mexican companies. They found that companies that use supplier financing are more likely to create economic value as long as they do not have collection problems, and that investment decisions must take inventory into account. However, their study is based on small-business owners' perceptions of the importance of decisions, leaving aside the study of variables such as business performance and competitiveness when carrying out financial strategies.

It is evident that most studies have focused on the analysis of the techniques used to make financial decisions rather than on the decisions themselves and their impact on competitiveness. This shows that corporate finance research has not taken into account small businesses' financial decisions. Likewise, researchers have not focused their attention on the study of organizational alignment strategies and financial decisions, to determine the consistency of entrepreneurs' decision-making about capital management and the strategic objectives to follow in order to compete in the market.

DATA AND METHODOLOGY

To develop this research, a random sample of 202 companies was used. The research technique used was the personal interview in order to obtain high quality, in-depth, detailed information. A questionnaire based mainly on 30 questions was used as a research tool. The analysis was based on three main questions: About your company's finances, what problems did you have, how did you solve them and what problems have not been solved? What are the strategies you have implemented? With regard to sales, what problems did you have, how did you solve them and what problems have not been solved? In addition, information about company age and size was used. The SPSS 16.0 statistical program was used for information analysis.Three hypotheses guide the research work. The first hypothesis deals with the main financial decisions business owners take in order to learn about the capital management underlying their operations. Major financial decisions might be expected to focus on financing and working-capital decisions, as the Mexican SMEs are characterized by lack of capital to support the day-to-day operations of the company. Therefore, the first hypothesis holds:

H1: SMEs' main financial decisions are about financing and working capital.

The second hypothesis considers financial decisions and their relation to the level of business competitiveness. In this sense, SMEs that have the ability to obtain funds would be expected to be the most competitive since they manage to secure the capital necessary for business operations (short-term) and to carry out investment projects.

H2: SMEs' that make funding decisions have higher competitiveness than businesses that only make working-capital and/or investment decisions.

The third hypothesis refers to the alignment between the financial decisions and business strategies that businesspeople implement. SMEs might be expected to make financial decisions that support competitive strategies; however, SMEs´ mortality rate suggests that deficient management of financial capital is one of the main causes.

H3: SMEs' financial decisions and business strategies are not aligned.

Financial decisions, strategies and business competitiveness measures are shown in table 1. The statements were analyzed and interpreted based on these variables.

Table 1: Measures

Variables	Classification	Definitions	Sub-Classification
Financial Decisions	Investment Decisions	Decisions focused on investing in an asset to generate satisfactory economic benefit in the short or long term.	
	Funding Decisiones	Decisions focused on obtaining resources for investment or for the operation of the organization.	• Bank • Savings Banks • Others (relatives, friends)
	Working-capital Decisions	Decisions focused on short-term assets and liabilities such as terms and conditions of sale, payment, inventory, cash, etc.	
Business Strategies	Integrative	Strategies to complement and/or acquire greater control over all activities relating to firm's supply chain	
	Intensive	Strategies focused on achieving better product position on the market and making the market grow.	
	Diversification	Strategies focused on introducing new products or product lines in the same or another market.	
	Others	Alliance strategies with any other company; liquidation strategies or reduction strategies that focus primarily on restructuring through cost-reduction strategy.	
Competitiveness	Sales Level	High level of sales: company is satisfied with sales amount, high number of customers, and high or low seasons do not affect sales. Medium level of sales: company is fairly happy with their sales because they depend on high seasons. Sales are not very constant. Low level of sales: company is not satisfied with sales because they are low. Lack of customers.	
	Firm age	• 1 to 10 years • 11 to 19 years • 20 years or more	

This table shows the definitions of the three main variables we analyze in our study.

EMPIRICAL RESULTS

Of the companies included in the sample, 91% are small and micro, 8.4% are medium and only 1% are large, making the sample composition similar to the distribution by size of enterprises at the national level (Mexico).The first hypothesis considers the companies' main financial decisions. 28.2% of the companies make investment decisions, 33.7% decide on working capital and 38.7% make funding decisions. This implies that few companies make investment decisions. They focus more on short-term working-capital decisions, where internal dynamics and the organization's operations require an analysis of payment terms and conditions, collection, inventory volume and cash management. Likewise, the results show that the most frequent decision in the organization is about funding, since the company is obliged to analyze the amount, conditions and sources of funding available to meet its obligations, generally short-term.

Table 2: Frequency of Financial Decisions

		Frequency	Percent	Cumulative Percent
Valid	Investment	57	28.2	28.2
	Funding	77	38.1	66.3
	Working-capital	68	33.7	100.0
	Total	202	100.0	

This table shows the frequency of the three types of financial decisions. Funding decisions are the most common.

The most common source of financing is relatives or friends, with 18.3%; 8.9% borrow from savings banks due to the less stringent requirements and the low interest; only 4% of organizations ask for

financing from banks due to the stricter requirements, high interest rates and occasionally to bank policies that do not consider most SME's to be creditworthy.The second hypothesis examines the relationship between financial decisions and the level of business competitiveness. The level of organizational competitiveness was determined on the basis of sales and the businesses' capacity to survive in the market. 29.2% of the companies have a low sales level, 42.6% have a medium level and 28.2% have a high level (see Table 3).

Table 3: Sales Level Distribution by Percentage

		Percent	Cumulative Percent
Valid	High	28,2	57,4
	Medium	42,6	100,0
	Low	29,2	29,2
	Total	100,0	

This table shows the relative frequency of the sales level, which measures organizational competitiveness.

Because sales are generated in a variable environment, several business owners mentioned that their medium level of sales is due to seasonality of their products, since sales peak in certain seasons, but drop off considerably in others. Other business owners with *low sales* argued that this situation is due to the high levels of inflation, which generates an increase in the raw price and sales cost, and therefore reduces the level of consumption; still others blame *poor organization of their personal finances* and a lack of customers. Companies with good sales levels considered that good planning and management, offering sales on credit, investing in new products, reducing costs, purchasing in cash in order to get a better price and product availability are the key elements to increase sales.

As for the relationship between financial decisions and competitiveness level as measured by sales (Table 4), of those companies considered competitive (good sales level), 35% make decisions about financing, 33% about working capital and 32% about investment. The results show that the level of an organization's competitiveness is not related to a specific type of financial decision; however, it can be said that the most competitive companies emphasize funding decisions.

Table 4: Relationship Between Financial Decisions and Sales Level (competitiveness)

Financial Decisions/ Sales			**Sales**			**Total**
			High	Low	Medium	
Financial Decisions	Investment	Count	18	18	21	57
		% within Sales	30.5%	31.6%	24.4%	28.2%
		% of Total	8.9%	8.9%	10.4%	28.2%
	Funding	Count	22	20	35	77
		% within Sales	37.3%	35.1%	40.7%	38.1%
		% of Total	10.9%	9.9%	17.3%	38.1%
	Working-capital	Count	19	19	30	68
		% within Sales	32.2%	33.3%	34.9%	33.7%
		% of Total	9.4%	9.4%	14.9%	33.7%
Total		Count	59	57	86	202
		% within Sales	100.0%	100.0%	100.0%	100.0%
		% of Total	29.2%	28.2%	42.6%	100.0%

This table shows the relationship between financial decisions and organizational competitiveness measured by sales level. There is no significant relationship between these variables.

If we consider a company's success in staying on the market as a variable of competitiveness, the results are different. At first, it is important to know that 46.5% of the companies have been on the market for between one and ten years, 21.3% between 11 and 19 years, and 32% more than twenty years .Table 5 shows that of the longest-lived (most competitive), 44.6% focus on working-capital decisions, 33.8% on funding decisions and 21.5% on investment decisions. If we evaluate companies that have remained between 11 and 19 years on the market, data show that 42 percent have taken funding decisions, 39.5% working-capital and 18.6% investment decisions. In this regard, organizations focused on investment decisions are those that have the fewest years on the market (61.4%), while organizations that focus on working-capital decisions are those that have managed to compete for more than 20 years. This may imply that efficient management of working capital is one of the essential decisions for the organization's survival as it relates to short-term assets and liabilities, those being the main financial difficulties that organizations face.

Table 5: Relationship Between Financial Decisions and Firm Age (competitiveness)

Financial Decisions			**Firm Age (in Years)**			
			1-10	**11-19**	**More Than 20**	**Total**
Decisions	Investment	Count	35	8	14	57
		% within FinanDecis	61.4%	14.0%	24.6%	100.0%
		% within FirmAge	37.2%	18.6%	21.5%	28.2%
		% of Total	17.3%	4.0%	6.9%	28.2%
	Funding	Count	37	18	22	77
		% within FinanDecis	48.1%	23.4%	28.6%	100.0%
		% within FirmAge	39.4%	41.9%	33.8%	38.1%
		% of Total	18.3%	8.9%	10.9%	38.1%
	Working-capital	Count	22	17	29	68
		% within FinanDecis	32.4%	25.0%	42.6%	100.0%
		% within FirmAge	23.4%	39.5%	44.6%	33.7%
		% of Total	10.9%	8.4%	14.4%	33.7%
Total		Count	94	43	65	202
		% within FinanDecis	46.5%	21.3%	32.2%	100.0%
		% within FirmAge	100.0%	100.0%	100.0%	100.0%
		% of Total	46.5%	21.3%	32.2%	100.0%

This table shows the relationship between financial decisions and organizational competitiveness measured by firm age. The results show that firms focused on working-capital decisions have managed to survive more years in the market.

The third hypothesis considers the relationship between financial decisions and business strategies. According to table 6, intensive strategies, which relate to the development of products and market, are the most commonly used in most companies (52.5%); entrepreneurs want to make their products known through advertising, and give good service to customers to expand their market (many businesses owners choose the intensive strategy because they do not need much capital to deploy it).

19.8% of the companies use integrative strategies, which focus on developing a proper supply chain in order to achieve greater control over distributors, suppliers, and/or competitors. This involves contacting larger suppliers, developing better relationships within the supply chain and contacting wholesale buyers for the positioning of the product, among other tactics.

Diversification strategies are only implemented in 13.9% of the sample, as are the strategies of liquidation, reduction or partnerships. Reluctance to implement such strategies could be due to low economic capacity to introduce new products, whether they are related to current products or not, as well as to the risk involved in introducing them.

Table 6: Frequency of Strategy Types

		Frequency	Percent	Cumulative Percent
Valid	Integrative	40	19,8	19,8
	Intensive	106	52,5	72,3
	Diversification	28	13,9	86,1
	Others	28	13,9	100,0
	Total	202	100,0	

This table shows the frequency of strategy types. Intensive strategies are the most common.

Table 7: Relationship between Financial Decisions and Strategy Types

			Strategy				
			Integrative	Intensive	Diversification	Others	Total
Financial Decisions	Investment	Count	11	31	6	9	57
		% within FinanDecis	19,3%	54,4%	10,5%	15,8%	100,0%
		% within Strategy	27,5%	29,2%	21,4%	32,1%	28,2%
		% of Total	5,4%	15,3%	3,0%	4,5%	28,2%
	Funding	Count	13	40	13	11	77
		% within FinanDecis	16,9%	51,9%	16,9%	14,3%	100,0%
		% within Strategy	32,5%	37,7%	46,4%	39,3%	38,1%
		% of Total	6,4%	19,8%	6,4%	5,4%	38,1%
	Working-capital	Count	16	35	9	8	68
		% within FinanDecis	23,5%	51,5%	13,2%	11,8%	100,0%
		% within Strategy	40,0%	33,0%	32,1%	28,6%	33,7%
		% of Total	7,9%	17,3%	4,5%	4,0%	33,7%
Total		Count	40	106	28	28	202
		% within FinanDecis	19,8%	52,5%	13,9%	13,9%	100,0%
		% within Strategy	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	19,8%	52,5%	13,9%	13,9%	100,0%

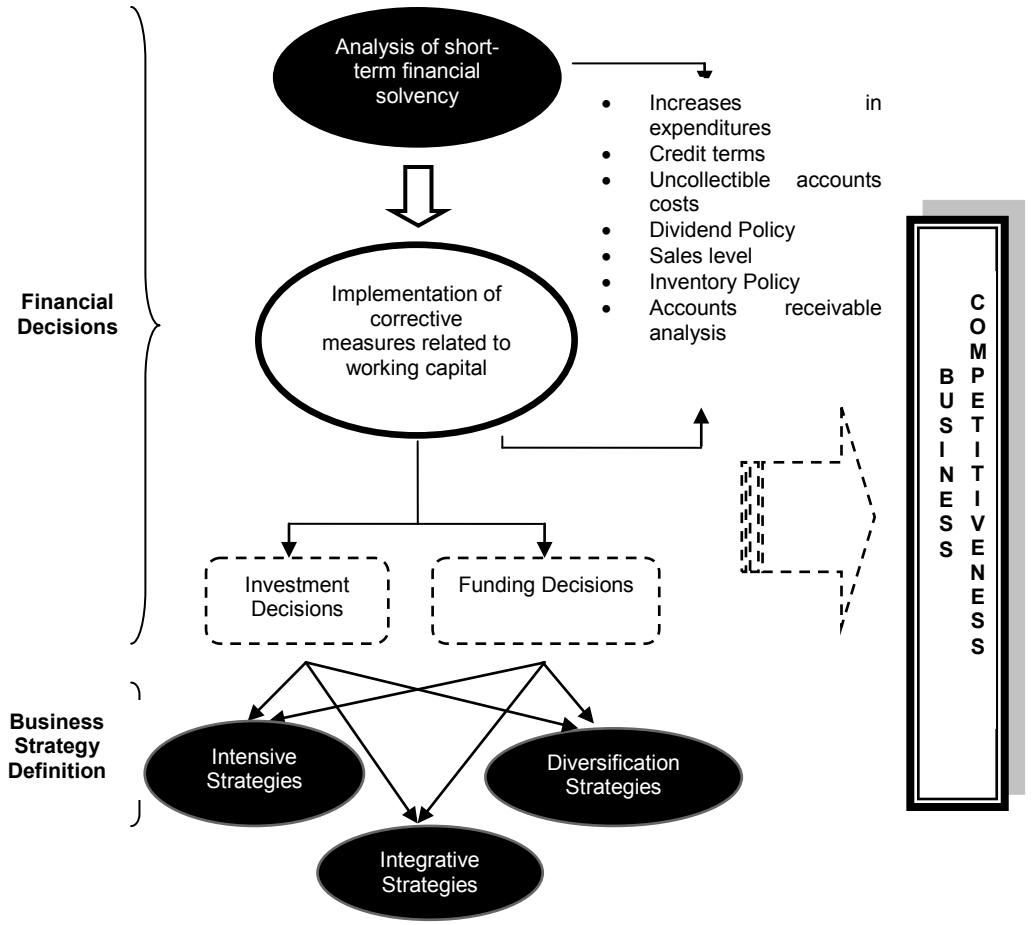
This table shows the relationship between financial decisions and the type of strategies implemented by firms.

When the relationship between strategy types and financial decisions is analyzed (table 7), the results show that of the total number of companies implementing integrative strategies, 27.5% make investment decisions, 32.5% funding decisions and 40% working-capital decisions. It would be expected that enterprises wanting to achieve greater integration with distributors or suppliers must plan and manage needed investments to carry out integration actions like purchasing transportation equipment or machinery to produce raw material. However, the results show that most companies do not plan their investments and focus primarily on working-capital decisions.

Regarding intensive strategies, the results show that 29.2% make investment decisions, 37.7% funding and 33% working-capital decisions. When an organization implements strategies to achieve greater market penetration, product improvement or new market development, it needs to focus primarily on funding and investment decisions, and then on working capital. The results show a balance in financial decisions.In order to implement diversification strategies, greater analysis of investment decisions (21.4%) and funding (46.4%) would be expected. However, data show that nearly 33% of companies focus on working-capital decisions. In this sense, we can say there is no alignment between business strategies and financial decisions; this means that financial decisions do not support the strategies' implementation.Based on the results of this investigation, the following model is proposed for financial

and strategic decision-making. The model shows that it is important to analyze and solve issues related to working capital, which is the basis for business development. Once the company has generated corrective proposals to improve short-term financial solvency, it is in a position to make decisions regarding both investment and financing, depending on the strategies that it has defined as part of its strategic planning.

Figure 1: Decision Making Model- Business Strategies and Financial Decisions



The figure shows a decision-making model where financial decisions and business strategies must be aligned in order to obtain business competitiveness

CONCLUSIONS

Currently the business environment is complex and dynamic, requiring a greater capacity for adaptation if businesses want to be competitive. A business role that has regained importance is financial resource management due to the need to make more efficient use of the resources companies possess. In this sense, there are three fundamental categories of decisions that any organization should consider as necessary no matter what its size: working-capital decisions, investment decisions and funding decisions.The main objective of this study is to examine financial decisions and business strategies implemented by Mexican organizations, as well as their relationship to competitiveness. Researchers interviewed 202 business people encoded the information based on discourse' analysis and variables definition.
Results show that most micro and small enterprises make funding decisions and apply an intensive strategy (development of products and market); their ability to survive in the market is low and sales are

at the medium level, implying that Mexican companies lack a high degree of competitiveness, which hampers their development and expansion at all levels. We found that companies that efficiently manage their short-term assets and liabilities are more competitive (company's success in staying on the market as a variable of competitiveness). In addition, the results show there is no alignment between business strategies and financial decisions; this means that financial decisions do not support the strategies' implementation.In order to raise business competitiveness, business owners need to adopt strategic management where objectives are proposed and actions are implemented. If there are no objectives from the outset, it becomes very difficult to formulate a competitive strategy, regardless of the firm's size. Likewise, the business owner must know and analyze the financial decisions that affect the organization's development in order to obtain an alignment between organizational goals and financial decisions and thus enhance the company's growth. There are diverse factors over which the small-business owners have the ability to attenuate and prevent the negative effects of financial difficulties.

Businesspeople must have sufficient financial support to sustain organization operations while achieving the breakeven point; otherwise, development potential decreases due to lack of capital. No matter what their organization's size, owners must begin to generate financial-accounting information to fulfill bank financing requirements. When businesses have financial information, they are also able to analyze investment needs (considering cost-yield) to determine the optimal capital structure, to set dividend policy and to define funding strategy. It is also necessary to apply cash management techniques and establish credit policies and inventory policies through the analysis of the organization's operating cycle. With these actions, owners can have greater success in dealing with financial difficulties; however, they must be aware that there are externalities such as macroeconomic conditions, interest rates, the international environment, weakness of internal market, rising prices, inflation, exchange rate, among others, that can influence business performance.

The study of Mexican SMEs presents difficulties especially when we talk about finance because businesspeople neither have nor want to offer financial information, even for academic purpose. In this case, the information on sales level as a variable to measure competitiveness has its limitations as it is based on business people's perception of their sales.Future research needs to analyze the relationship between business strategies and financial decisions in specific industries, in such a way that the design of decision-making models considers their specific characteristics and problems, as well as their externalities, as factors that impact organizations' performance.

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SHARING TACIT KNOWLEDGE WITHIN ORGANIZATIONS: EVIDENCE FROM THE CZECH REPUBLIC

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ABSTRACT

Knowledge is a changing system with interactions among experience, skills, facts, relations, values, thinking processes and meanings. Literature differentiates between the two dimensions of knowledge, explicit and tacit. Explicit knowledge can be expressed in formal and systematic language and can be shared in the form of data. ICT makes this process easy these days. Tacit knowledge is highly personal and hard to discover. Explicit knowledge and intuition, mental models, experience, crafts and skills etc., create it. It is partly or fully subconscious, deeply rooted in action, procedures, routines, commitment, ideas, value and emotions of individuals or groups. It is very difficult to turn into data. Attempts to formalize it usually lead to its damage. Even though tacit knowledge is an important asset that enables us to do practical activities, many organizations underestimate it. This article discusses the basic theoretical background of tacit knowledge, its importance for modern organization and the results of research on tacit knowledge management in organizations in the Czech Republic (Central Europe). The research is qualitative and helps us to monitor development of knowledge management activities in our country. It started in 2004, continues to this day and currently provides the experience of 145 organizations.

JEL: M19

KEYWORDS: knowledge, tacit knowledge, apprenticeship, communities, storytelling

INTRODUCTION

This paper presents results of research on tacit knowledge management and sharing carried out in organizations in the Czech Republic (Central Europe). Having started in 2004, the research provides us with a detailed analysis of knowledge management and management of tacit knowledge sharing in 145 organizations. Knowledge is a major creative force of the knowledge society. Its potential can be fully exploited only if proper knowledge management is introduced. An important task of knowledge management is to optimize the flow, creation and exploitation of knowledge in an organization. Knowledge management must cover both explicit and tacit knowledge in relation to the specific needs of an organization, in relation to its strategic objectives, culture, principles and habits.

Our research shows that organizations in the Czech Republic still do not understand the importance of tacit knowledge and that they don't know how to work with it and how to manage it. Only 19% of reviewed organizations know and use all three tools for tacit knowledge sharing intentionally; apprenticeship (we use the term coaching for this paper; see below), communities of practice and storytelling. Organizations have a great reserve in the application of methodology of individual tools. For example, employees are usually coached by their direct managers (44%); coaches are not rewarded for their effort (58%), organizations do not manage the relationship between the coach and the coached (27%), they do not reward community members for their activity (81%) and they do not use storytelling (70%).The latest literature on knowledge management offers many concepts, systems and recommendations. They can be classified into three large groups: the first group addresses the problems of explicit knowledge, the second group is focused on work with tacit knowledge and the third group tries

to address knowledge management systematically, e.g. combine the work with both tacit and explicit dimensions with the corporate system of management.

Our paper is focused on work with tacit knowledge, and it can be classified into the second group. It provides the reader with an analysis of work with all three tools of tacit knowledge sharing in a very detailed way. As far as we know, such an analysis has never been undertaken before. The major benefit can be seen in the description of mistakes organizations make when using the tools of tacit knowledge sharing. We think that these mistakes are universal and that they are not a specialty of organizations in the Czech Republic.The paper is organized into the following sections. The section, Abstract, explains the topic and purpose of the article.The section, Introduction, makes the introduction to the paper and explains the basic findings of the research. The section, Literature Review, gives the reader the background of important ideas and concepts of knowledge. The section, Data and Methodology, explains the theoretical and methodological background of our research. The section, Results, provides the reader with the results of our research on tacit knowledge sharing in organizations in the Czech Republic. The article is closed by the section, Concluding Comments, that provides a summary of the results of our research, explains the limits of the paper and gives ideas on potential future research.

LITERATURE REVIEW

This section is focused on a brief definition of the important terms and basic concepts in the field of knowledge management. Knowledge itself can be defined and understood in many ways. For example, Veber (2000) defines knowledge as a changing system with interactions among experience, skills, facts, relations, values, thinking processes and meanings. Tobin (1996) understands knowledge as information plus intuition and experience. Nonaka and Takeuchi (1995) define knowledge as justified true belief. Beckman (1997) writes that knowledge is information plus choice, experience, principles, limitations and learning. Kanter (1999), says knowledge is information with context that provides the basis for actions and decision making. Knowledge can be classified into different groups. Spender (1995, 1996) offers a classification to an individual (owned by an individual) and a collective (owned by a group) knowledge. Spender also identifies different types of knowledge used in organizations: conscious knowledge (explicit knowledge held by the individual), objectified knowledge (explicit knowledge held by the organization), automatic knowledge (preconscious individual knowledge), collective knowledge (context dependent knowledge visible in the practices of the organization).

Nonaka and Takeuchi (1995) offer classification to two types of knowledge; explicit (transferable to data) and tacit (hidden in the heads of people). Nonaka and Takeuchi see knowledge as created and expanded through the interaction between tacit and explicit knowledge.Explicit knowledge is encoded in formal organizational models, rules, documents, drawings, products, services, facilities, systems, and processes and is easily communicated externally (Vail, 1999, Al-Ghassani, Kamara, Anumba, Chimay, Carrillo, 2006). Its conversion takes two forms (Nonaka, Takeuchi, 1995). It can be converted to tacit knowledge through internalization when an individual reads and understands well coded knowledge. It can also be converted to another type of explicit knowledge through combining more than one form of knowledge to generate new knowledge. Although conversion of explicit knowledge is easier than that of tacit knowledge, it still requires several resources such as time, technology, and commitment (Vail 1999, Al-Ghassani, Kamara, Anumba, Chimay, Carrillo 2006).

Tacit knowledge is stored in peoples' brains as mental models, experiences, and skills and is difficult to communicate externally (Vail, 1999). The conversion of tacit knowledge also takes two forms (Nonaka, Takeuchi, 1995). It can be converted to another tacit knowledge through socialization in face-to-face interactions or to explicit knowledge through externalization by codifying an individual's knowledge.

Capturing tacit knowledge and codifying it is one of the biggest challenges of knowledge management (Bair, O'Connor 1998, Al-Ghassani, Kamara, Anumba, Chimay, Carrillo, 2006).

There are several definitions of knowledge management, too. Knowledge management can be defined from two perspectives; a process perspective and an outcome perspective. The process perspective focuses on how to work with knowledge; the outcome perspective stresses the benefits of knowledge management for an organization (Bair, O'Connor 1998, Al-Ghassani, Kamara, Anumba, Chimay, Carrillo, 2006). A combination of both perspectives is also possible.

Newman (1991) and Kazi (1991) see knowledge management as a process of controlling the creation, dissemination, and utilization of knowledge. Snowden (1998) understands knowledge management as the identification, optimization, and active management of intellectual assets, either in the form of explicit knowledge held in artifacts or as tacit knowledge possessed by individuals or communities to hold, share, and grow the tacit knowledge. Kanter (1999) sees knowledge management to be concerned with the way an organization gains a competitive advantage and builds an innovative and successful organization. Tiwana (2000) understands knowledge management as the management of organizational knowledge for creating business value and generating competitive advantage. For Tiwana (2000) knowledge management enables the creation, communication, and application of knowledge of all kinds to achieve business goals. Klasson (1999) defines knowledge management as the ability to create and retain greater value from core business competencies (Al-Ghassani, Kamara, Anumba, Chimay, Carrillo, 2006). All definitions focus on the fact that knowledge is a valuable asset that must be managed, and that knowledge management is important to provide strategies to retain knowledge and to improve performance (Al-Ghassani, Kamara, Anumba, Chimay, Carrillo, 2006).

DATA AND METHODOLOGY

The research on knowledge management and management of tacit knowledge in organizations in the Czech Republic started in 2004 and continues to the present day. The intention of the research is to monitor the development of knowledge management activities in our country. Organizations are chosen randomly. They come from different industries, including public administration and government areas. The size of organizations also varies; we have interviewed both big multinational organizations and SME's. The smallest organization only had 7 employees. The only prerequisite for an organization to be covered by the research is the location of its premises in the Czech Republic. The research is qualitative based on a questionnaire. Mostly, the questionnaire consists of closed questions with the option of commentary; some open ended questions are supplied, too. Questionnaires are completed under the supervision of a trained interviewer.

The questionnaire is divided into the following sections. Section 1 covers questions on the character of the interviewed organization – name of the company, description of its major business, annual revenues, number of employees, and the educational profile of its employees. We also ask organizations if they are owned by foreign capital and if they export to markets abroad. Section 2 is focused on questions that analyze the profile of human resources of an organization in more detail; like those on the structure of employees by age and sex. A major part of section 2 consists of questions on important structural prerequisites of knowledge management; knowledge strategy, type of organizational structure, cooperation, relation of the organization to knowledge, and trust. Section 3 asks questions about ICT. Its role is to discover which means the organization uses to support work with explicit knowledge. Section 4 is focused on the style of work in the organization and includes questions on the type of meetings, job descriptions, communication and communication channels. This section helps us to find out whether an environment for the sharing of tacit knowledge exists within the organization or not. Section 5 asks questions about traditional apprenticeship programs. Section 6 enquires how organizations train new

employees. This section helps us to discover about knowledge intensity of the work in the organization. We ask not only questions on how the organization trains newcomers but also how the newcomers' knowledge fits the organizational needs and requirements. The next three sections are dedicated to tools used for working with tacit knowledge and tacit knowledge sharing. All three traditional tools for tacit knowledge sharing are examined (Mládková, 2005). Section 6 asks questions on coaching and mentoring. We are interested especially in the average time of coaching activities, the style of relationship between a coach and a coached person, and how the organization rewards coaching activities. Section 7 analyses communities. We are interested in formal and informal communities, both physical and virtual. Organizations are also asked about typical dysfunctions that communities tend to suffer. Section 8 is the last section and asks questions concerning storytelling. The existence of negative and positive stories within an organization is checked. We also ask whether or not stories are used in the company purposefully and where they are usually told.

The questionnaire provides us with detailed information about work with knowledge and knowledge management in interviewed organizations. It helps to identify best practices, mistakes and problems and presents us with a picture about the quality and functionality of the knowledge market in the organization. Some questions are interlinked; answers to them should be compatible. These questions are important as they validate the questionnaire. The reason for any incompatibility of answers to such questions is always strictly enquired and the interviewer is asked to explain the reason in detail. In case of any doubts the questionnaire is rejected. The theoretical background of the research is as follows. Knowledge management literature offers various definitions and concepts of knowledge (see the section, Literature Review). Knowing well the reality of business in our country and keeping in mind the fact that final users of our work are our managers, we decided to use the simplest possible concepts and terminology. We divide knowledge into only two dimensions, explicit and tacit.

We explain the explicit dimension of knowledge as knowledge which can be expressed in formal and systematic language and can be shared in the form of data, scientific formulae, specifications, manuals, etc. It can be processed, transmitted and stored. We support the idea that explicit knowledge is actually information and can be transferred to data. E.g., explicit knowledge can be formalized and stored and distributed as data (Mládková, 2005). These days, data is usually distributed and stored using ICT. It means that when working with explicit knowledge we mostly work with a piece of technology.

The tacit dimension of knowledge is perceived as highly personal and hard to discover and formalize. Explicit knowledge and intuition, mental models, experience, crafts, skills, etc., create it. It is deeply rooted in action, procedures, routines, commitment, ideas, value and emotions. It is always related to a living being or to a group and is difficult to share and communicate (Mládková, 2005). We agree on Polanyi's statement that tacit knowledge is problematic to externalize because the process of externalization damages it (Polanyi, 1966). Managing tacit knowledge means managing people. Both dimensions of knowledge can be identified in any organization. The explicit dimension is usually present in the form of data in a corporate ICT system; the tacit dimension is in the heads of employees (Mládková, 2005). Both dimensions interact in the process of knowledge conversion (Nonaka, Takeuchi, 1995). We are well aware of the fact that knowledge cannot be simply split into two parts and that it is difficult to separate its explicit dimension from the tacit one. We always highlight this fact when explaining what knowledge is to students and managers. From our point of view, the concept of two dimensions has an important practical advantage – it helps us to explain to our students and managers that tacit knowledge cannot be managed in the same way as the explicit one. This mistake is quite common in our traditionally hierarchical environment (Mládková, 2010). This article covers only the part of the research dedicated to tacit knowledge and its management.

RESULTS

There are three ways in which to share tacit knowledge; apprenticeship, storytelling, and communities. Apprenticeship is based on the relationship between the master and the apprentice. The master developed his knowledge and skills over the years in different situations. He tries to articulate (make them explicit) and demonstrate them to the apprentice. The enviable part of the apprenticeship is sharing through the non-verbal personal practical experience of the apprentice, carefully monitored by the master. The apprentice is reshaping the master's knowledge to his own knowledge.The process is slow and is based on some social obligation (social contract), e.g., both master and apprentice are obliged to co-operate - the apprentice is obliged to learn and the master is obliged to pass on his knowledge. The master's obligation is important in the later phases of the apprenticeship when he may feel threatened by a bright apprentice. The apprenticeship process is replicated in the coaching and mentoring processes these days. As the words apprenticeship and mentoring may evoke special meanings, we use the word coaching to describe apprenticeship activities in our research. The only exception is traditional apprenticeship programs related to vocational training. These programs are covered by a different part of the questionnaire and are not part of this paper. Coaching as a method of leadership was not examined. Questions concerning coaching were focused on the official coaching activities of organizations.

Table 1: Coaching

	∑	%
Organization provides coaching	91	63
Organization also coaches employees who are not managers	67	74
Coach is chosen by his work results	14	15
Coach is chosen by experience	12	13
Coach is a direct manager of coached	40	44
Coach is an external subject	13	14
Coach is chosen in accordance with specific needs of coached	19	21
Coach receives financial reward	24	26
Coach receives different than financial reward	4	4
Coach receives no reward, coaching is part of his duties	53	58
Organization manages relationships between coach and coached	5	5
Organization intervenes only when coach and coached have problems	42	46
Organization does not interfere in the relationship between coach and coached	25	27

Table 1 provides answers to questions on coaching. We were interested if our organizations coach their employees and if they also coach employees who are not managers. We also asked who serves in the role of a coach, five options were offered: the one who has good work results, the one who has the necessary experience (we expect that people with good work results and experience possess the necessary tacit knowledge), direct manager of coached, external subject, and coach is chosen in accordance with the specific needs of the coached person. Another set of questions informs about how organizations reward coaches. Four options were offered: coach receives financial reward, coach receives different than financial reward, coach receives no reward, coaching is part of his duties. The last set of questions enquired if organizations manage the relationship between coaches and coached. Three options were offered: the organization manages the relationship between the coach and coached, the organization helps when the relationship between coach and coached experiences problems and the organization does not interfere in the relationship between the coach and coached. Percentages in the first line of the table are calculated with a total of 145 organizations. The rest of the percentages in the table are calculated with the number of organizations that reported caching, which is 91. All percentages in table 1 are rounded up.

The results of research on coaching are as follows; 63% of interviewed organizations provide coaching for their employees, 74% of organizations that provide coaching even coach employees who are not managers. Coaches are usually direct managers of coached employees – 44%. The proportion of coaches chosen by different parameters is much smaller: coaches chosen due to their work results - 15%, coaches chosen due to their experience - 13%, external coaches - 14%, and coaches chosen in accordance with the needs of the coached person - 21%. Coaching is usually understood as a part of the coach's duties - 58%; 26% of coaches receive financial reward (usually external coaches) and 4% of coaches are rewarded in a different way.

Research shows that coaching is a popular method of tacit knowledge sharing in our organizations. On the other hand, organizations do not properly manage coaching processes. It is questionable if direct

managers should also fulfill the role of coaches (questions on coaching were focused on official coaching initiatives; coaching as a method of leadership was not studied), if they have enough time, knowledge and willingness to be good coaches. The findings that organizations do not reward their coaches and that they influence the relationship between the coach and the coached only when problems appear also indicate inefficiencies. Communities are groups of people who have some common interests (domains) and share knowledge, experiences, tools and best practices to solve problems.

Human relationships in a community are friendly and supportive. Community members depend on each other's knowledge, skills and expertise. Communities may be created purposefully (formal) or emerge naturally from volunteers (informal). They may be physical or virtual. Communities can be efficient only when good connection and communication exists between people. People join communities to fulfill their emotional, intellectual and other needs. Communities help their members to share tacit knowledge, develop new expertise, increase influence, make contact with people with similar interests and build new relationships. They are isles of stability in an instable and chaotic world. Organizations profit from communities (of course apart from the dysfunctional ones). Communities develop and share new knowledge, increase capacity for innovation, help to solve difficult problems and serve also as an element of positive motivation. Again, keeping in mind the specifics of our region (knowledge management is not as common as it is for example in the USA) we decided to use the general term community as the term including various types of communities.

Table 2: Communities

	∑	%
Organization has communities	96	66
Organization has informal communities	59	41
Organization has formal communities	37	26
Organization has virtual communities	23	16
Communities are only in separated departments	39	41
Communities are also between departments	65	68
Communities contribute to innovativeness	44	46
Communities improve quality and delivery times	43	45
Communities improve cooperation inside and outside organization	61	64
Communities help to avoid expensive mistakes	42	44
Organization provides help to most communities (formal and informal)	47	49
Organization provides communities with financial help	22	23
Organization provides communities with help concerning knowledge	38	40
Organization helps communities to search for and build important contacts	11	11
Organization helps communities in cooperation with other teams and communities	16	17
Organization helps communities to find new valuable members	14	15
Organization helps communities with communication	25	26
Organization does not help communities at all	39	41
Organization rewards members of communities	18	19
Organization measures performance of communities	15	16
Communities in our organization suffer with elitism	23	24
Communities in our organization create knowledge monopolies	38	40
Communities in our organization hesitate to cooperate with other subjects	49	51
Communities in our organization have strong entrance barriers	15	16

Table 2 provides data on communities. The first set of questions examined the existence and type of communities. Percentages in the first four lines of the table, e.g. percentages concerning the existence of communities in the organization, informal, formal and virtual communities are calculated from a total of 145 organizations. The rest of the percentages in the table are calculated with the number of organizations that reported communities, which is 96. Apart from questions regarding the existence and type of community, we asked questions such as in which parts of the organization communities work, if they are separated in departments or cooperate across department borders. We were also interested if communities contribute to innovativeness (innovation?), quality, cooperation and if they help to avoid mistakes. Another question was focused on if and how organizations help their communities, reward community members and measure the performance of communities. The last set of questions examined the dysfunctions of communities. All percentages in table 1 are rounded up.

Results of the research on communities are as follows; 66% of interviewed organizations reported communities, 41% of interviewed organizations reported informal communities, 26% of interviewed organizations reported formal communities and 16% of interviewed organizations reported virtual communities. The fact that only 26% out of all organizations reported that they have formal communities

indicates that our organizations do not know what a community is and how important it may be for the organization.On the other hand, answers to questions on where in organizations communities operate indicate that communities are not limited only to separate departments - 41%. They are functional across departmental borders - 68%, which improves the sharing of tacit knowledge on the corporate level. When asked about the benefits of communities, 64% of organizations that reported communities think that communities improve cooperation, 46% see their benefits in contribution to innovations, 45% in improvement of quality and delivery times, 44% in avoiding mistakes. When asked if organizations help and support communities, 49% of organizations answered that they support their communities (we did not differentiate between formal and informal communities in this question), 41% reported that they do not support them all. The type of support varies: 40% of organizations provide their communities with help concerning knowledge, 26% help communities with communication, 23% provide financial help, 17% help to connect the work of communities with the work of other communities and teams in the organization, 15% help to find new community members and 11% help communities to build important contacts. Only 16% of organizations measure performance of their communities and only 19% reward community members. Again, this result indicates that organizations do not work with communities as they should and that those few organizations that build formal communities (39% out of those who reported communities) make serious mistakes in their management (lack of performance control, nearly no rewards to members, under-financing).

Mismanagement of communities may be contra-productive. The results show that communities suffer with typical dysfunctions. 51% of communities do not want to cooperate with other subjects in the organization and 40% of communities create so called knowledge monopolies. It means that they understand knowledge as a competitive advantage and do not share it with other parts of the organization. Knowledge monopolies inhibit knowledge markets of organizations and lead to ineffectiveness in work with knowledge. 24% of communities suffer with elitism; their members think that they are special and better than other employees and groups. On the other hand, only 16% of communities build strong entrance barriers that do not allow new members to participate in their activities; it means that communities in our organizations do not protect themselves against new members.

The third tool for tacit knowledge sharing is storytelling. A story is a complex system of symbols. Stories give sense to things and events and represent norms, experiences and explanations of reality. Basic values of people and groups are projected into them. We use stories to create personal and group identities, change social practices and to share values. Our private stories determine what we accept, how we see the world and influence our response to incentives. People use stories naturally many times a day without being aware of their special meaning. A story is a virtual experience that enables the listener or reader to create his own tacit knowledge in reality, simulated by the story. A story can be used for tacit knowledge sharing between two or more people. It has the ability to pick up links and relationships that cannot be externalized (Mládková, 2005).

Results of the research show that people naturally communicate mostly in their workplace (41%) and in places where they naturally meet (32%). This indicates that the majority of tacit knowledge is shared in this environment. Only 3% of organizations build special spaces for communication and tacit knowledge sharing. 70% of organizations report that their employees tell especially negative stories. Positive stories prevail in only 30% of organizations. By Denning (2004) and Kelemen et al (2010) negative stories are stories about danger, problems, solved or unsolved, defeat. Positive stories are stories about victories, and fulfilled desires and wishes. Negative stories enable people to learn. They describe mistakes, moments of ignorance, and difficulties people had to overcome. Negative stories help us to learn new knowledge and understand and change the reality. Positive stories help people create and share visions and objectives. They can be identified where something new is happening; they help to create new organizations, states, families, teams, communities. Positive stories help people to understand the

standpoints of others. Both types of stories are present in any organization. The type of stories that prevail in an organization tells a lot about its health. Negative stories indicate that the organization is in some trouble and tries to cope with them. Positive stories indicate positive changes in an organization.

Only 30% of organizations reported that their managers use stories intentionally in managing their subordinates. It is a pity, because a proper story can overcome mental barriers people build against new knowledge, improve communication between people, raise their creativity and help them to find common values and solve conflicts. Stories have the ability to open the imagination of people and increase their innovative potential. A story can work as a catalyst for changes (Mládková, 2005). When put together, results of research show that only 28 (19%) organizations use all three tools for tacit knowledge sharing intentionally.

Table 3: Storytelling

	∑	%
People informally communicate in the workplace	60	41
People informally communicate in places where they naturally meet	46	32
People informally communicate in a specially created space and environment	5	3
People informally communicate in other places	15	10
Employees of the organization tell first and foremost negative stories	101	70
Employees of the organization tell first and foremost positive stories	44	30
Managers use stories in the management of an organization	43	30

Table 3 provides data on storytelling. The questionnaire on storytelling examined in which environment people in organizations communicate and share stories, whether they tell negative or positive stories and if managers use storytelling intentionally to manage their subordinates. As for the place of communication, respondents were given a few options: the workplace, places where people naturally meet such as kitchens and restaurants, special places intentionally created by organizations or somewhere else. All percentages in table 1 are rounded up.

CONCLUDING COMMENTS

The research on knowledge management and tacit knowledge sharing indicates that organizations in the Czech Republic have big reserves in working with tacit knowledge. The research started in 2004 and continues to this day; 145 organizations were interviewed. The research shows that coaching is the most common intentionally used tool of tacit knowledge sharing. Coaching in the meaning of the research includes also mentoring and similar apprenticeship activities. 63% of organizations provide their employees with coaching. Unfortunately coaching is not managed properly. Employees are usually coached by their direct managers (44%); coaches are not rewarded for their effort. Organizations do not manage the relationship between the coach and the coached (27%).

Communities were identified in 66% of organizations but 41% of them were informal communities that evolved naturally. Only 26% of organizations reported intentionally created formal communities. It is very positive that 68% of communities are cross-border communities. On the other hand, only 16% of organizations measure the performance of communities and only 19% reward community members. Communities suffer with typical dysfunctions: 51% of communities do not want to cooperate with other subjects in the organization, 40% of communities create knowledge monopolies, and 24% of communities suffer with elitism. Our communities are relatively open for newcomers, only 16% of them build strong entrance barriers. Storytelling is a tool of high potential but only 30% of organizations reported that their managers use storytelling for management of their subordinates consciously. In 70% of organizations, a negative type of story is prevailing. Positive stories prevail in 30% of organizations. Employees share their tacit knowledge mostly in the workplace (41%) and in places where they naturally meet (32). 3% of organizations have a special room for communication and knowledge sharing.

As pointed out above, only 28 (19%) organizations use all three tools for tacit knowledge sharing intentionally. Results of the research indicate that organizations in the Czech Republic still do not understand the importance of tacit knowledge and do not know how to work with it and how to manage it. Those who try to manage their tacit knowledge make unnecessary mistakes because they are not aware of the basics: what is tacit knowledge, why it is important, which tools can be used for tacit knowledge management and sharing and how to use them. The fact that Czech organizations do not use one of their major assets as they could may have cultural roots. Our society is historically hierarchical and managers of our organizations may have problems accepting that an important asset is hidden in the heads of their subordinates and they cannot control it directly. With this approach, unfortunately they miss using an important success factor of our time.

The author is aware of some limitations of this paper. The most important fact that should be mentioned is the inconsistency of the data collected. Reviewed organizations do not belong to one group and were not interviewed in one period. We interviewed all different types of organizations, from very small to large multinationals. The research has been continuing since 2004 with the number of interviewed organizations varying year on year and external economic conditions changed. The inconsistency of the data is the reason why the author of the article decided not to undertake any statistical analysis. It would bring biased results. We think that research on tacit knowledge is important because tacit knowledge is the dimension that enables us to do practical activities and makes the difference between doing things well or otherwise. We see many options for future research. For example, research on how people build their tacit knowledge or how they work with it would be very beneficial for both theory and practice.

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AKNOWLEDGEMENTS

The author would like to thank all respondents for their help and patience. She would also want to express thanks to reviewers and proofreaders of this article.

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EVOLVING DYNAMICS IN THE PROCESS OF BUSINESS INTERNATIONALIZATION

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ABSTRACT

Over the past century the global economic scene has undergone numerous rapid and ongoing transformations. The consequences of these changes are reflected in problems linked to organizational and qualitative adaption that companies must carry out in order to compete successfully. The goal is to achieve strong economic growth and obtain accurate and timely information regarding emerging markets. In this context it has become a priority for dynamic companies to take their business overseas in order to grasp opportunities offered by foreign markets for their goods and services.

JEL: F0; F13; F23

KEYWORDS: internationalization, economic development, competitive ability

INTRODUCTION

Globalization places markets in ever closer contact, reduces physical and cultural differences and intensifies international competition. All this puts the survival of various types of companies at risk. Yet, at the same time, it offers a growing range of business opportunities for enterprising companies, provided they are able to create a distinctive image for their products and services on the world market. Technological innovations that have reduced cognitive differences allow companies easier and more rapid access to information making them better able to compete offering opportunities for expanding business. Given the ease with which a business can become global, few sectors can consider themselves safe. Thus, the only means of defense is an offensive strategy, in other words to accept the challenge. Perhaps the best ways for companies to do this is enter the international market themselves.

The expansion into foreign markets, business internationalization, represents a basic means for creating value, guaranteeing returns on investment, increasing competitive edge, and gaining new opportunities and means for growth. Nevertheless, the decision involved in going global is complex since the factors to be considered are numerous and unpredictable. Moreover, one can never have all the relevant information on foreign markets or their environmental conditions. This is obviously the case for large companies but also, and especially, for small and medium ones. In the past internationalization was a course taken nearly exclusively by large scale companies. They were the only firms in a position to overcome trade barriers and other obstacles and establish themselves on major overseas markets. Only in recent years that smaller sized businesses have become a presence on the international scene. One of the most interesting characteristics of the current global economic situation is the birth of a new phase of internationalization, in which no company of whatsoever size or sector is unaffected.

The summary of the paperr is as follows: Section 2 describes the literature review. Research, methodology and empirical models are described in the Section 3. Section 4 presents the findings of the research. Section 5 concludes the paper, highlighting the limits and the future research perspectives.

LITERATURE REVIEW

Market globalization involves companies of all sizes competing against each other on the international market where it is increasingly difficult to assess external threats or opportunities and evaluate strong

points or areas for improvement within the company. Generally globalization is seen as a recent phenomenon, beginning around the late 1980s and early 1990s. Several factors can be cited to explain its emergence: the marked expansion of the private sector both on the domestic and international scene; the crisis and collapse of Communist block, especially in the Soviet Union; and the growth and spread of new information science technologies, both in the business sphere and in every day life. All of these have reduced the time, cost and technical difficulty of long distance communication. (Pepe, 2006)

At one time globalization implied the simple exportation of goods and services or, at most, the transportation of a plant used for production overseas. Today it involves much more, and consequently management decision making, rather than being circumscribed by consideration of a single region or nation, must operate on a global level. Globalization imposes new behaviours on companies, which must aim towards the creation of a sustainable competitive advantage. The levers required to face this new situation, in a successful way, are innovation, knowledge, information, creativity and the integration of skills and expertise with global networks.

The most importance consequences of globalization, therefore, can be summarized as follows: 1) the reduction of costs and time required to cross national frontiers reduces the obstacles linked to operating in foreign markets, and thus facilitates the international expansion; 2) the abolition of trade barriers facilitates technological transfers; 3) the geographical growth of trade increases demand on global markets; this, in turn, leads to the adoption of considerable economies of scale.

The first author to write about the internazionalization markets was Coase (1937). He noted that in the late 30's the concept of the efficient firm, that under certain conditions, can substitute the market in organizing economic exchanges. Later on, Buckley and Casson (1976) developed these concepts on the contrary, repositioned of internazionalization within the more general theory of transactional costs.

Bernard and Jensen, (Bernard and Jensen 1995), Melitz (Melitz, 2003) Helpman, Melitz and Yeaple, (Helpman et al., 2004) Helpman et al. (Helpman et al 2007) and Bernard et al. (Bernard et al 2007) analyzed the behavior of of a firm in a single industry in terms of productivity, capital intensity, degree of specialization of the workforce and environmental factors (Bernard and Jensen, 1995; Melitz, 2003; Helpman, Melitz and Yeaple, 2004; Yeaple, 2005; Helpman et al. 2007; Bernard et al. 2007). These authors believed that, under competitive pressure, firms behave diferently and have different performance. Import and export flows and the foreign direct investments (IDE) impact not only on the results, but also on the productivity trend and employment within a sector.

Recent studies on international commerce explain the exiguous number of export firms with the high level of fixed costs (sunk costs) that firms have to bear to penetrate foreign markets. These costs determine a selfselection effect and a reallocation of market shares towards highly productive firms (Tybout and Roberts, 1995; Bernard and Jensen, 1999). For this reason a high number of firms export a few products to a limited number of other countries (Helpman et al., 2007; Chaney, 2008).

This self-selection effect is defined by Melitz (Melitz, 2003) as a pre-entrance effect. On the other side there is the post-entrance efect, defined as the "learning by exporting" effect (Wagner, 2007). This effect explains the growth of productivity as the consequence of the export activity or, generally, of an internazionalization process.

If we turn our attention to the historical background of this phenomenon it is necessary to return to the days of ancient Rome. There are still records describing the commercial relations between Greece and Rome in this period. The Romans undertook the construction of ports, roads and other infrastructure in order to guarantee the continuity and safety of commerce. This was a time when everyone spoke the same

language (or languages the Greco-Roman world was bilingual) and followed a similar life style (Falcone, 2007).

After the fall of the Roman Empire, trade declined drastically and new models for living together slowly emerged in the Medieval period. By the 18th century new liberal policies once again encouraged international trade, especially after the 1789 French Revolution. After the French revolution different countries began to form closer relationships; each nation started to emerge from its former isolation and become increasingly dependent on other nations. In these years the international market is dominated by Great Britain that assumed the role of economic world leader. With time other European countries started to catch up and acquire their own colonial empires, but Britain still remained the leader until outbreak of the First World War.

A key development in the global economic history of the 20th century is the Breton Woods conference in 1944, which established the economic and financial relationships between the world's major industrialised states. At the conference a decision was made to set up key international institutions: the International Monetary Fund (IMF), and the International Bank for Reconstruction and Development (IBRD) which today is part of the World Bank. These organizations based on the principal of free trade, were established with a clear aim to oversee international payments, trade and movements of capital. In 1945, after the Second World War, 50 countries came together to form the United Nations Organization (the 51st country Poland was not present and had to sign later). The aim of this organization was to further peaceful cooperation between nations across the world (Nifo, 2010). Subsequently, in 1947, twenty three countries signed the General Agreement on Tariffs and Trade (GATT), an international agreement that laid the ground rules for a multilateral of commercial relationships, with the overall aim of reducing customs barriers and encouraging international trade.

In 1961 a group of important industrialized nations, including the USA, Australia, Canada and Japan set up the Organization for Cooperation and Economic Development (OCED) in Paris. This organization was founded with a clear goal to intensify economic development and promote trade links between member countries. In 1995 the World Trade Organization (WTO) was set up to substitute the GATT. The role of this organization is to adjudicate in international trade disputes, and encourage trade between nations in general as well as monitoring the numerous existing economic accords between member states

DATA AND METHODOLOGY

In each of the aforementioned periods we find a different form of international expansion. At the beginning, companies adopted a mercantile approach to international trade. Later, internationalization moved on to a translational scale. The key player in this transformation was the US multinational company whose aim was to extent its branches across the globe. In these years, companies privilege an organizational structure on a large scale and use Foreign Direct Investments (FDI) as the means of market expansion. FDI favor and multiply movements of capital from countries where the rate of profit is low (developed countries) to those countries with a much higher rates of profit (developing countries). It is through studying the interest rates in different countries that one can begin to understand how the phenomenon of business internationalization originated and developed (Spiegarelli, 2003).

Even today the favored form of internationalization adopted by companies is the decentralization of various phases of transformation and production. In recent years, however, there has been a further change in this process; companies are now looking at new forms of collaboration and cooperative agreements at the global level. The reason for this is the continuous evolution of markets, products and technologies that require less hierarchical, more flexible and decentralized structures that are capable of responding and adapting to the ongoing changes in the environment.

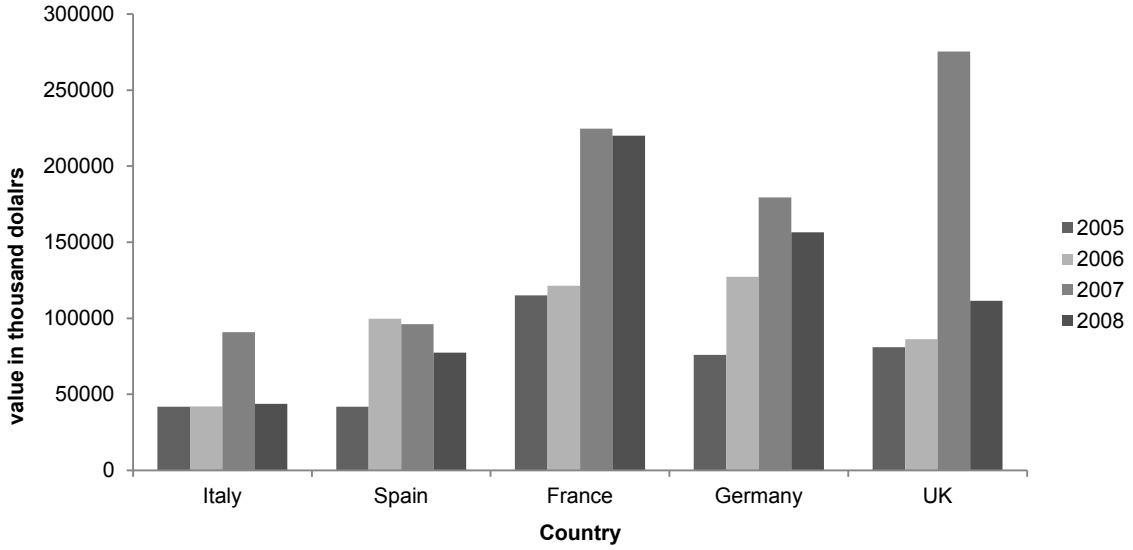
We can also see a rapid increase in the number of small and medium firms entering the international scene. Currently it is common to find a small firm with a small workforce and a minimal management structure involved in commercial relationships with overseas partners. In such a context, therefore, internationalization appears so much an option but a necessity for many businesses. The choice of one means of internationalization over another normally depends on the company size. Greater company size tends to coincide with a greater propensity to overseas trade.

Internationalization can take one of two basic directions: overseas investment and the off shoring of the production of both goods and services or the ability to attract foreign investment. It is clear that these two aspects are closely linked. They are aspects of the same process of the international relocation of productive activity seen from two different perspectives. They require different, albeit closely linked, policies. One cannot utilize foreign investment effectively, without being equally effective in attracting foreign investment in the opposite direction (Vaccà, Rullani, 1983).

Table 1- Outward FDI

	Italy	**Spain**	**France**	**Germany**	**UK**
2005	41826	41829	114978	75895	80883
2006	42068	99646	121370	127223	86271
2007	90781	96062	224650	179547	275482
2008	43839	77317	220046	156457	111411

Figure 1 - Otward FDI

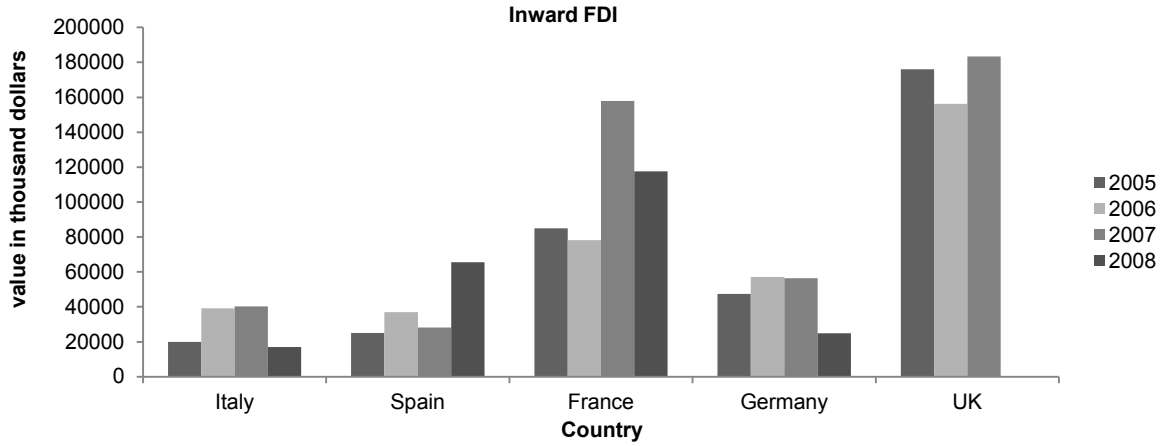


Source: our calculations on Ice-Istat data 2009

Table 2- Inward FDI

	Italy	**Spain**	**France**	**Germany**	**UK**
2005	19975	25020	84951	47440	176008
2006	39239	36949	78154	57147	156183
2007	40202	28179	157973	56407	183386
2008	17032	65539	117510	24939	96039

Figure 2 - Inward FDI



Source: our calculations on Ice-Istat data 200

From the above tables, if we compare Italy with that of the other major industrialized countries by looking at both inward and outward FDI (figure 1 and figure 2), we immediately see a gap that can be attributed to the characteristics of size and sector that constitute the strength, but also the main weakness of the Italian system of production.

RESULTS

There are numerous factors that can help explain processes of internationalization and the decision companies about to embark on global markets face regarding the choice of horizontal or vertical integration. Among such factors we should mention technological innovation, and exploitation of the new means of communication and information, such as E-commerce, internet and so on. These technological developments have, in recent years, accelerated the pace and reduced the costs of global communication. Nevertheless, certain authors assert that technological changes alone, notwithstanding their fundamental importance, are not sufficient to explain the phenomena of business globalization (Bertali, Rangene, 2006).

For a company whose aim is to grow and expand, innovation represents a crucial step, because it is through innovation that new solutions are created and added to the company's treasury of knowledge and skills. In brief, we define it as a continuous process directed, on the one hand, towards modifying the ground rules of current practices, products and services and, on the other, towards developing knowledge and specific skills to be used also outside the local context. (Diuresi, Lisi, 2005). It has become indispensable for every company to reconvert their productive systems along the lines of a model that privileges the qualities, technologies and immaterial resources of their product. As such, it is essential to invest in information technology and telecommunications as well as life long learning.

Innovation helps make businesses more competitive both by increasing the value of the service/product in terms of design, and by reducing overall production and marketing costs through the optimization of productive activities. Innovation is also important for mature technologies and can be introduced, not only in the company's very own productive processes, but also in the phases of research and design that come before the realization of a service or a good.

The spread of new technologies (communication, information and the internet) supports processes of internationalization and promotes new forms of collaboration, not so much within companies, but

externally through companies connecting with other businesses (trade, production and technology agreements with external partners, alliances, joint ventures and so on). Moreover, the aforementioned reduction of technological and cognitive distance, in terms of time and cost, has enabled small and medium companies to benefit from easier access to the information they need to expand.

Information, therefore, has become a fundamental resource for the growth of world trade. Possession of exact, reliable and timely information is the source of company success. The ability to have, at one's disposal, the right information in real time, at an affordable cost, constitutes one of the key ingredients for operating successfully on global markets. Digital information that is concise, transparent and immediately accessible allows companies to acquire and increase the trust of clients and partners and establish stable economic relations at international level (Zucchella, 2004).

To put all this in more concrete terms, it is necessary to utilize new information and telecommunications technologies correctly. The internet plays a particularly important and incisive role. The use of the net enables companies to become information intensive, i.e. it facilitates the exchange of information, at one and the same time, between business partners, companies and clients, companies and their competitors and within each individual company. Information technology allows us to elaborate, memorize, store and communicate information regardless of format, distance, time or volume.

Besides the globalization of distribution and commerce, companies have started to expand into international markets in search of a low cost workforce in countries having a profile that includes a large pool of cheap labor and limited costs. With regard to finding the right location for productive activity abroad and placing products on foreign markets, one of the variables to be considered is undoubtedly the choice of the most suitable market on which to launch your products. To make this choice companies use their previous experiences in similar markets, or they aspire to imitate and follow the moves made by competitors with similar products, dimensions and resources. In order to minimize the financial and economic risks involved, the company must carefully select the right markets, seeking out those characterized by a high potential demand, and where the competition is not too fierce (Comba, 2009),

Companies need to coordinate and manage their activities in different geographical locations. They should take into consideration the diverse conditions found in each area with regard to the availability of raw materials, specialized labor, cheap labour, advanced technology and so on. These aspects lie at the basis of strategic company planning.

To this end, the availability of a series of different kinds of precise and timely information enables the company to make rational decisions geared to repeating on the global scale the successes already achieved on the national level. At the same time they wish to identify and develop the specific new skills and abilities required to achieve desired results in the international arena. (Freeman, Perez, 1986). Companies able to deal with the complexities encountered in the new and wider competitive global environment must measure themselves against the constant need for innovation and specific lasting expertise. The real sources of competitive advantage can be found in the ability of each company to consolidate technologies and productive skills in practices that ensure the company's capacity to adapt rapidly to the changing opportunities and demands that arise in the global context.

CLOSING REMARKS

Thanks to these new information and communication tools, and to the reduction of distance between counties, in terms of both space and time, companies have access, in ever shorter times and at ever lower costs, to markets that were previously out of reach. This enables companies, on the one hand, to exploit, to the full and with greater efficiency, the market potential of their products in different areas spread

across the globe. It also allows them to access resources and produce goods or components in places that are more fruitful strategically and economically. Information, thus, becomes a productive factor of fundamental importance in the process of internationalization. The concept of information is often used as a synonym of communication, but it is important to specify how communication on one side and information on the other represent two different realities, even if they are intertwined in the relationships a company shapes with the sales or supplies market.

The main limitation of the paper is that company success on new markets depends basically on the ability to innovate. Small companies cannot afford a high level of scientific and technological skills in order to compete successfully on international markets. Becasuse of this they must adopt different strategies, in particular those geared towards the differentiation and personalization of their products. Moreover, companies should be able to develop evolved organizational forms based on synergy and collaboration with suppliers, clients and, where necessary, with competitors, in order to overcome limitations strictly linked to their small size.

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RESTRUCTURING THE FINANCIAL CHARACTERISTICS OF PROJECTS IN FINANCIAL DISTRESS

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ABSTRACT

This paper deals with project finance restructuring in the view of future or present financial distress. We treat the occurrences of negative cash flow and negative NPV as signs of potential project distress. The solutions offered for negative cash flow are (1) restructuring debt thereby making it payable earlier when the project has sufficient cash influx or (2) change of the project management and contractors. The paper explains advantages of the first technique over the second. We explain that legal costs in the latter can exceed perceived benefits. The paper argues the best solutions for negative NPV problems are deferring of payments and restructuring of cash disbursements as a part of the project financial agreement.

JEL: G31, G32

KEYWORDS: Project Finance, Financial Distress, Positive Cash Flow, Positive NPV, Finance Restructuring

INTRODUCTION

Despite "the fact that more than $200 billion of capital investment was financed through project companies in 2001, an amount that grew at a compound annual rate of almost 20% during the 1990s, there has been very little academic research on project finance." (Esty, 2004) According to (Hainz & Kleimeier, 2004) the value of deals closed in the January 1980–March 2003 period was about 960 USD billion. This amount equals 5% of the total syndicated loans allowed worldwide in the same period (Gatti, Rigamonti, Saita, & Senati, 2007).

The topic of project finance has been a source of a large number of journal articles. The discussion generally is at the descriptive level. The comprehensive financial analysis of the Eurotunnel failure, presented in (Vilanova, 2005), is one of the few studies performing financial analysis of the phenomenon. The authors of this paper argue that financial tools described in financial textbooks can resolve complex and non-trivial problems causing the failing financial conditions of a project. However, application of these tools requires knowledge of the specifics of project finance especially its contractual side.

There are several unrelated reasons for a project to be in distress, namely managerial, organizational or financial. Projects can suffer from poor performance due to objective conditions such as supply delivery faults, fluctuations in quality and labor force availability. The majority of these reasons have nothing to do with financial elements of the project. They can influence the financial outlook of the project but rarely cause a big financial concern. Well-structured project financing has a sufficient number of securities, bonds and covenants, which are required or set in place to compensate for poor performance.

Invoking covenants or withdrawing conditions cannot prevent financial distress by itself. The causes of distress are usually set in place by the provisions of the original contract. Unless there is a looming bankruptcy threat, the project company may not be aware of the distress problem. Moreover, the project company will often not admit to its existence even if they detect the distress condition. Project lenders

are the only party interested in maintaining the projects financial health and the conditions of its debt. They often initiate the procedure to eliminate distress conditions.

This paper merges the general concepts of finance with the specific terms and techniques existing in the project finance field. It takes the financial terms, such as NPV and Cash Flow and shows how to improve a project financial standing by achieving positive NPV and Cash Flow. The research discusses the methods of reaching the desired financial conditions based on project finance features. The paper presents the literature review followed by the discussion of several methods of improvement of NPV and Cash Flows. The last part of the paper offers conclusions based on the presented methodology and suggests directions for further research.

LITERATURE REVIEW

According to (Marx, 1998), venture financing is commonly based on swapping equity for debt. In the case of a small project or a start-up venture, the scheme of financing is very simple. One company usually applies for financing with one or several financial institutions. The venture financing uses a principle of swapping debt for equity. However, there are a few significant differences between conventional financing and project financing. In conventional financing, the following is usually true: (1) the ratio of equity to debt is often in the 30-40% range with 49% of sold equity being a commonly set limit. This limit is set because the borrower wants to retain control over the policies and activities of the company. (2) Small borrowers are required to have a significant amount of recourse in a case of financial failure. The lenders want to be sure that they would be able to mitigate the risks of failure connected with financing (Berger & Udell, 1995).

According to (Kleimeier & Megginson, 2000) project financing uses limited or no-recourse approach. The project company formed to take over the financial part of the project has very limited assets besides the assets of the project itself (Nevitt & Fabozzi, 2000). Therefore, the lenders must rely on the success of the project as a mean to the recovery of the debt. Projects, seeking project finance, are usually very large in scope and long in duration. No single financial institution can afford to carry the debt for the full term of the project. According to (Esty, 2001) this means that syndicated financing is the only type of financing the project can obtain. The large projects, such as Eurotunnel, typically have over a hundred lenders at any time during their existence (Stonham, 1995; Vilanova, 2005).

A venture typically seeks financing to create or acquire assets with the intent to sell them later to recover the borrowed funds (Gompers, 1995). Project, on the contrary, may not create any sellable assets. It tends to create assets, which will generate the cash flow by means of their exploitation (Esty, 2002). Toll highways, apartment building complexes, public buildings, such as hospitals and schools, are examples of these assets. For venture, financing the average repayment period is 3-5 years. According to (Esty, 2002a), it can take as much time for the large project, just to start generating the cash flow, by moving into the post-construction stage.

When the project company seeks financing, it prepares the offering, in the form of an information memorandum. In it, the company describes the project in enough detail. This gives the lender sufficient information for making an informative decision on the project worthiness of money lending (Fight, 2006). The information memorandum is very similar to the conventional marketing plan. It outlines the production process, the business strategies and the means of generating cash flow. The non-recourse nature of the project financing usually warrants larger expert based due diligence, than a venture financing (Amalric, 2005). The best interests of the project compel it to disclose as much information as possible about the nature and the process of the project (Ueda, 2004). In the project financing both a lender and a borrower employ the services of the independent engineers to sign off the technical plans.

The presence of the independent experts make the finance seeking party providing honest and comprehensive information, compiled to the best of their abilities (Dell, et al., 2004).

Due to the prolonged nature of the project, the project financing must take into consideration much larger number of risks than any venture financing (Rode, Lewis, & Dean, 2003). The projects, which have to operate over the longer period, are more susceptible to environmental, economic and financial conditions (Grimsey & Lewis, 2002). The lenders must take into account all risks, associated with the project operation and the surrounding environment. The project company is often required to take additional securities and insurances, associated with these risks. This in turn makes a project more costly (Stulz, 1999). The project company can identify some of the risks upfront by using the expert analysis. However, it cannot foresee some of the risks at the time when it seeks financing. The unidentified risks can contribute to the financial distress of the project if they require additional funds to mitigate them. One of the most typical examples of distress compounding factor is raising cost of fuel and supplies. It alone can skew the financial planning of the project (Ruster, 1996).

The term Net Present Value or NPV lies in the base of a very common distress condition (Esty, 2004). NPV represents the present value of the future net cash (Gitman & Hennessey, 2005). The NPV calculations use the estimated inflation value. We consider the projects with the negative NPV as failures, because they actually lost money at the end of their cycle. The NPV calculations cannot give a complete objective picture of the success or the failure of the project. The person calculating NPV estimates the rate of inflation at the time of the calculations. This future rate of inflation can fluctuate based on the expert perception and economic outlook. However, recalculating NPV on the regular basis can give a lender a good idea of whether the project is on track to generating the positive cash flow or slides closer to a financial distress.

Some lenders use the internal rate of return (IRR) of the project as a measure of the project health. IRR represents the discount rate under which NPV is zero. It is the rate of bringing the project even. Banks usually have preset conditions for IRR/NPV for the venture type investments (Chen, Weston, & Altman, 1994). According to (Yescombe, 2002), the project can negotiate the IRR/NPV of its financing because of the advantage established by a mere size of the project.

When a lender or a group of lenders perceive a project is edging closer to financial distress, they take action. In a large project, the number of lenders is very high. It is common to have 150-200 lenders with a stake in the project at the same time (Sufi, 2004). The project has the large number of vendors because its debt is a publicly traded financial instrument. At the same time, a large number of stakeholders makes it hard to achieve consensus on the state of the project finance and to come to a solution, which will satisfy all parties. The lenders are equity participants (shareholders) of the project. The only method of communicating the project financial state to them is through the annual shareholder statements and the annual shareholder meetings. In distress times, the large number of shareholders can become a detriment to project finance if the solution to financial problems requires quick and determinate action. One mechanism, proposed in the literature is the immediate buyout and the concentration of shareholder debt in the hands of a few key lenders (Vinter & Price, 2006). In the case of buyout success, the concentrated group of lenders is able to make swift and direct decisions over the project future. If the buyout does not happen within a short timeframe, attempts of restructuring of the project can appear futile.

The buyout of minority equity holders can also drive the debt of the project higher especially if the project is uncertain by nature. An example of such project is oil exploration in non-drilling areas. The minority holders can perceive the attempt to buy them out as an effort to consolidate profits in a view of future discoveries. In this case, they can hike the price of their equity share (Vilanova, 2004).

METHOD

This paper discusses two different types of distress, namely negative NPV and negative cash flow. Negative cash flows or a cash deficit can happen in the project at any time. Raising operating costs are a common explanation for this phenomenon. There are many reasons for cost overruns. However, we can classify them into the following types: (1) Raising costs of materials, machinery, labour and other current expenses. This problem commonly occurs in the long-term ventures or projects. The current costs tend to rise due to the current demand, state of economy and inflation. (2) Labour or safety legislations with immediate effective date cause increase in maintenance and labour costs. (3) Scheduling problems can contribute to the negative cash flows of the project. During the construction stage of the project, the discrepancy in the availability of the personnel and machinery can cause the additional lease payments on the unused equipment.

The influx of additional cash can rectify the negative cash flow problem. While it sounds like a very simple solution, it has many serious complications. The additional project cash can come as a loan or as a savings measure. Since all equity holders in the project are lenders to the project, the additional loan can come in the form of a cash draw similar to a partnership cash draw. There are several negative consequences of this procedure. Every equity holder must agree for the cash draw to happen. The additional loan usually decreases equity value (similar to the share split). If investors perceive the project as having troubles, selling the additional debt is not easy.

The second approach to solving the cash flow problem is finding additional cash resources within the project itself. Usually projects of large size employ a variety of law and consulting firms each specializing on one or very few tasks. If the lender does not prescribe the engagement of these firms in the financing covenants, the project can revise, monitor, consolidate (into one or fewer sources) or eliminate the use of these consultants. The increase in project management efficiency is another source of savings. The "waste" of cash by management can appear in the form of mistiming of leasing of key equipment, poor scheduling of the labour force, inability to secure the vacancy of the project real estate lots, etc. These scheduling mistakes carry consequences of tighter control of, or outright replacement of the management body. Performing this procedure in publicly traded companies is easy. These organizations can assemble a meeting of shareholders faster than the project company could. On the other hand, the project company is not a contractor itself. It relies on the contractors to lend expertise and perform work. Cost overruns and cash waste can occur deep down in the contracting hierarchy. The project company may not have knowledge about cash problems unless they surface in the form of non-payments. Sometimes it is not easy to replace a contractor in the middle of a project due to loan covenants, which specify this contractor for a particular work. Sometimes, changing this contractor because of the financial issues can be more costly than investing more into continuing working with them.

Table 1 represents the initial state of the project as envisioned during its inception. The project company estimated the project cash flows as positive and commenced the project. Now, suppose that during the course of the project a contractor incurred additional costs due to mismanagement, lease conflicts and other issues. Change in the project cash flow must occur. Assuming that there are no additional internal sources of cash, such as reserve working capital, the new project outlook will look as depicted in Table 2.

Table 2 shows the project does not meet its cash obligations in the years 2012-2015, which puts it into a distress condition. There are several ways to rectify this distress condition. Table 2 shows project interest payments form a straight line. The renegotiated payments, presented in Table 3 bring positive project cash flow to the sponsor. Knowing that the lender would rather renegotiate loan payments than call off the full loan, this restructuring can prove itself feasible if the rest of the numbers stay in place.

Table 1: Initial Financial Indicators (in $1000)

Years	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Gross Revenues	0	0	360	1124	1304	1236	1150	712
Capital Expense	540	780	80	0	0	0	0	0
Operating Costs	0	0	124	132	148	164	180	196
Taxes	0	0	0	0	376	564	528	432
Cash flow before debt	540	790	156	992	780	508	442	84
Drawdowns	460	664	0	0	0	0	0	0
Debt Repayments	0	0	0	308	310	308	308	0
Interest payments	0	0	124	124	92	62	30	0
Cash Flow to Sponsor	80	116	32	560	378	138	104	84

The table is adapted from (Fight, 2006). It shows the main financial indicators for the project in relatively good standing indicated by a positive cash flow in all years of project existence.

Table 2: Influence of Additional Cash Draw (in $1000)

Years	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Gross Revenues	0	0	360	1124	1304	1236	1150	712
Capital Expense	540	780	80	0	0	0	0	0
Operating Costs	0	0	124	132	**548**	**364**	**330**	**300**
Taxes	0	0	0	0	376	564	528	432
Cash flow before debt	540	790	156	992	780	508	442	84
Drawdowns	460	664	0	0	0	0	0	0
Debt Repayments	0	0	0	308	310	308	308	0
Interest payments	0	0	124	124	92	62	30	0
Cash Flow to Sponsor	80	116	32	560	**-122**	**-62**	**-46**	**-20**

The table shows changes in project financial structure incurred by drawing additional cash towards the operating costs later in the project lifecycle. The changes to the project finance numbers are shown in bold

It is not possible to alter the project financial infrastructure post-factum. However, based on the calculations presented in the Table 3 it is possible to suggest that deferring some of the cash payments to the sponsor and directing the freed funds towards the debt/interest repayment reserve must help the project company to keep overall cash flows positive despite the potential extra cash withdrawals.

The syndicated lenders can also suspect that the position of the project showed in Table 2 occurred due to the poor management and not due to the objective circumstances. In this case, the lenders can consider the action of replacing the management rather than renegotiating the loan term. It can happen if the lenders do not believe that the present management can keep the financial situation of the project under control and that the projections of current costs do not represent reality. We assume that the financing agreement has a number of covenants, including the contractor covenant, which allows the replacement of the original contractor. Let us also assume that the replacement of the contractor brings the costs of the project lower, thus altering cash flow depicted in table 2 in the following manner.

Table 3: Restructure Interest and Debt Payments (in $1000)

Years	2008	2009	2010	2011	2012	2013	2014	2015
Gross Revenues	0	0	360	1124	1304	1236	1150	712
Capital Expense	540	780	80	0	0	0	0	0
Operating Costs	0	0	124	132	548	364	330	300
Taxes	0	0	0	0	376	564	528	432
Cash flow before debt	540	780	156	992	780	508	442	84
Drawdowns	460	664	0	0	0	0	0	0
Debt Repayments	0	0	0	**616**	**310**	**308**	0	0
Interest payments	**80**	**104**	**124**	**124**	**0**	**0**	**0**	**0**
Cash Flow to Sponsor	**0**	**12**	**32**	**252**	**-30**	**0**	**292**	**-20**

Table shows restructured numbers for interest and debt payments. The numbers in bold indicate the changes which can be applied to the project to keep it out of the distress position

This cash flow situation looks more promising to both the lender, who will rely on the same payment schedule, and to the sponsor, who will be drawing positive cash from the project. Although the situation seems very bright from the cash flow perspective, the sponsor and lenders should incur additional legal and administrative fees. The firing of the old contractor and process of selecting a new one are the source of the additional expense. These expenses in the form of legal fees should not exceed the gains from the restructuring in any given year. The initiators of the restructuring must keep this in mind and factor contractor replacement into the cash outlook of the project.

Any project distress caused by negative cash flows is certainly fixable. The project companies and lenders are inclined to negotiate the restructuring of debt rather than to change the project structure. With all things being equal, the restructuring of debt lowers risk and decreases uncertainty better than the change of management. If all parties are honest with each other and attempt to perform to the best of their abilities, the restructuring of debt would be much less taxing on the project company and the lenders, than changing the project management and the contractors. It is not a given, that the new management would be able to achieve the reduction in costs and the positive cash flows, shown in Table 4.

Table 4: Cash flow after Contractor Replacement (in $1000)

Years	2008	2009	2010	2011	2012	2013	2014	2015
Gross Revenues	0	0	360	1124	1304	1236	1150	712
Capital Expense	540	780	80	0	0	0	0	0
Operating Costs	0	0	124	132	**348**	**264**	**230**	**250**
Taxes	0	0	0	0	376	564	528	432
Cash flow before debt	540	780	156	992	780	508	442	84
Drawdowns	460	664	0	0	0	0	0	0
Debt Repayments	0	0	0	308	310	308	308	0
Interest payments	0	0	124	124	92	62	30	0
Cash Flow to Sponsor	80	116	32	560	**78**	**38**	**54**	**30**

The table shows changes in the cash flow which resulted in bringing the new project management team which reduced the cost projections in the later stages of the project. Numbers appearing in bold figures constitute the difference as compared with the ones in Table 2.

Any financial institution, which acts as a lender to a project of any size will seek positive NPV as an assurance that the project work reflects both good performance and good faith on the part of the project company. The NPV calculations commonly rely on two major components, namely an initial investment

and the cash returns from the construction and maintenance work. The NPV calculations use a discount rate to bring the future values to their present equivalents. This rate represents the best possible estimation effort based on the knowledge and the experience of those, calculating NPV. Since large projects have a large number of lenders in syndication, these lenders must agree on the common discount rate for the calculations of the financial outcome for this particular project.

Unlike the cash flows, which have an immediate effect on the operation of the project, NPV has no real bearing on whether the project will or will not be completed. On the contrary, the project can have negative NPV and enough cash to accomplish all project plans. Even considering this, NPV is still a very valid factor of estimating a relative financial position of the project at any time during its lifecycle. The financial and economic conditions in the country where the project takes place and in the financial world change on the regular basis. Therefore, the NPV calculations are due for every report period to reflect changing rates of inflation (discount rates).

Let us assume that a project obtained 1,000,000 USD in lent finances in order to complete the work. If we look at the numbers in Table 1, we will see the value of total drawn cash is 1,492,000 USD. It seems to be enough to cover the operations of the project and yield profit to a sponsor. Let us assume that the cost of borrowing or discount rate is 10%, which is a very favorable rate in North America. At this rate, the project NPV is -17,920 USD. It means that the project would be "no go" had it just started under the described conditions. Let us now assume that this is a tail end of the project, which incurred additional costs and has to continue in order to generate revenue. In this situation, we are dealing with the project in distress, which needs restructuring in order to meet the lender's NPV conditions. In this paper, we discuss two ways restructuring the finances of the failing project, namely generating more cash up front and drawing the cash at the future dates.

It is not likely that the project generates more revenue than originally projected. In order to generate more cash, the project would have to defer expenses. Table 5 shows cash flows of the project with the deferred operating expenses. The figures in bold show changes to project cash flows. The project's NPV changes to 62,930USD making it a profitable. Although this technique is very tempting for the project companies and the lenders, it is not acceptable for the recipients of the cash, such as lease companies, contractors and suppliers of the raw materials. It might take a negotiating power of the lender to make the cash recipients accepting changed conditions.

This technique can only be considered if leasing vendors of the equipment have surplus of the inventory or the contractors seek to participate in the project for the reasons other than monetary (ex. upstart company with no record of accomplishment, which desperately requires good references).Unlike the project companies, the lenders to the project are usually mature financial institutions. They can offer the project a schedule of cash disbursements instead of a lump sum, provided at the beginning. In order to illustrate this technique, we use data from Table 1 and assume that lenders and borrowers agreed that project would receive 500,000 at the beginning and 500,000 at the end of year 2011. In this case, NPV of the project will be 175,970USD and the project will retain the positive NPV. This technique is much more preferable for the project, than the one, requiring the deferred payments. It does not require any third party concessions. On the other hand, structuring of the cash disbursements will require additional legal work. The financing contract should have extra covenants, ensuring that lenders keep their commitment. A cash only transaction in excess of existing cash can be pending almost indefinitely if third party does not accept the structured payments or the lender guarantees.

Lenders, such as banks, rarely have surplus of cash. They operate using proceeds of short-term investments and interbank operations in their cash flow. If present financial and economic conditions change significantly, the lender may not have enough cash to cover its financing commitments. If the lender has a temporary cash problem, the project company can seek a bridge financing loan, charging its

interest back to the original lender. The project can encounter another distress condition if the lender is not able to fulfill their obligations at all. During the financial crisis, it is entirely possible that the lender becomes permanently insolvent.

Under the regular financial conditions, a project, seeking to resolve the negative NPV problem, prefers separate cash disbursement to deferring cash payments. In the conditions of the financial force majeure, the cash can be unavailable. The guarantees of the availability of the deferred cash do not secure its actual availability. The project falls into the ultimate distress condition.

Table 5: Generating Cash Upfront (in $1000)

Years	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Gross Revenues	0	0	360	1124	1304	1236	1150	712
Capital Expense	540	780	80	0	0	0	0	0
Operating Costs	0	0	**0**	**0**	**272**	**296**	180	196
Taxes	0	0	0	0	376	564	528	432
Cash flow before debt	540	790	156	992	780	508	442	84
Drawdowns	460	664	0	0	0	0	0	0
Debt Repayments	0	0	0	308	310	308	308	0
Interest payments	0	0	124	124	92	62	30	0
Cash Flow to Sponsor	80	116	**156**	**692**	**254**	**6**	104	84

The figures in this table show project position which is based on generating more cash at the beginning of the project by deferring the operating costs to the later stages of the project. Changes from Table 1 are shown in bold.

CONCLUSION AND FUTURE RESEARCH

Any project can fall into distress due to the mismanagement, problems with contractors and suppliers and so on. Covenants in financial agreement can resolve a number of mentioned problems. They anticipate many of such problems based on the experience of lenders and borrowers alike. Legal preparations and due diligence can rectify and mitigate the financial risks by using securities, bonds and insurance terms.

This paper deals with the elements of project financial distress. The models, provided in this paper are extremely simple. They show potential solutions to some financial problems a project can encounter, such as negative future cash flows and negative NPVs. While these problems constitute a good reason for concern for lenders and maybe a project company, they are hypothetical problems, dealing with future cash flows and future negative NPV calculated based on the future earnings. The paper shows that a remedy for the future problems exists at present time. Anticipating these problems, the financiers, such as lenders and borrowers, must have a clear understanding that the displayed solution is only good for future situations as they appear in the present.

In the case of economic Force Majeure such as recession and/or depression, any lenders and borrowers can face the fact that the debt and the cash flows of the project are out of their control. The lenders might not be able to fulfill their obligations towards the project. The borrowers can face limited or extinguished cash flows due to the overall economic situation. If the project does not have sufficient reserve funds to continue and there are no lenders willing to take over project debt, it might fail or concede part of its profits in exchange for a remedy.

When a project is in the inception stage and seeks financing, its managing body must be able to anticipate potential threats and put a sufficient number of legal covenants in the financial agreement to cover some of the anticipated outcomes. By acting in such manner, the projects can reduce the number of the

potential distress conditions and enjoy the financial and operational success. The models presented in this paper are simple. Further research would result in analysis of a sufficient number of these projects with the purpose of analyzing their financial position. The author assumes that a number of such projects exist in countries with a large number of federal or local projects such as the countries of BRIC.

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