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Journal of International Business and Economic Affairs

Welcome to the first volume of the *Journal of International Business and Economic Affairs.*

Economics is the study of humanity's stewardship of resources, be it the individual's own wealth, property held on trust for another person, the assets of a business enterprise, public monies or the reserves of nature. As such it is the study of all deliberate human action which employs resources to attempt to achieve an intended outcome, whether the efforts are successful or unsuccessful and whether the aims are commendable or immoral. Economic theory does not exclude the duty to comment on the moral aspect of human behaviour or the evaluation of the advisability of human actions but it does not take as its premise that our behaviour is always intelligent or that it is bounded by morality. Economics concerns itself with all purposeful activity by human beings in the tangible world and within those confines it is the study and philosophy of virtue and wisdom, vice and folly.

It is the duty of the academic researcher – and we may speak of a duty inasmuch as the public purse pays the researcher's wages – to achieve four things: to describe accurately what happens in the human world; to explain why it happens; to propose improvements in the way that people strive to achieve their goals; and to warn of the consequences if those goals are achieved. That is not to say that the economist or the accountant has any power to improve the morals of humanity. Their task is restricted at best to advising on how human beings can better attain their goals, whether those goals are the aggregation of riches, the raising of the poor to positions of power, the protection of the natural environment or merely the promotion of branded eye shadow – or for that matter the overthrow of the financial bases of civic society. It must be left to the politician or the preacher to engage in debate with the public on the question of whether any of these goals is worthy of human effort or whether it is a dangerous scheme to be opposed and prevented. The social scientist can generally do no more than to say how it might best be done if it is to be done at all.

Nevertheless, the economist, the accountant and any other social scientist must be aware of their duty to warn of the consequences of achieving our short or long term goals. It is, for example, foolish to ask how manufacturing industry may be promoted in low-income countries without warning of the consequences of trapping millions upon hundreds of millions of poorer workers in jobs which are all too vulnerable to mechanization. Likewise, it is not sufficient to explain how free trade and the exploitation of comparative advantage can make the world as a whole a wealthier and more efficient place without acknowledging that the livelihoods of the less efficient may be destroyed in the process, regardless of whether their inefficiency is their own fault or the fault of others or merely the consequence of natural geography. Again, the economist may discuss whether, in peacetime, any particular country can more efficiently import its basic foodstuffs or produce them within its own borders but must not be oblivious to the dangers of over-reliance on a single food source when faced with wars or revolutions which may devastate domestic farmland and call labourers from the fields or, alternatively, sever supply lines from abroad. Although it is the job of the politician to consider whether benefits outweigh the costs in any particular

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policy decision, it is nevertheless the duty of the social scientist to point out what those costs might be.

It is the mission of this journal to publish articles of high quality relating to all aspects of human economic activity. In this first issue we present three papers, which concern themselves with themes which can be expected to feature significantly in any account of the development of the world economy in the 21st Century, namely, risk management, knowledge management and the orderly management of deregulation.

The management of risk has long been the key to the orderly conduct of business, both in industry and in government and the reporting of risk is a vital requirement for the understanding of the performance of any operation. However, the accurate reporting of risk, both internally and externally, requires willingness on the part of both the reporter and the reader not only to accept uncertainties but also to consider the full extent and consequences of those uncertainties in detail. The desire of the professional accountant to provide a single definite number for the value of each asset or liability is a worthy desire when reporting what has happened in the past or is true in the present but when the theme strays into future outcomes, as is expected by planners and investors, the pretence of certainty cannot be reasonably maintained, especially as many future events will fall into the extensive category of the foreseeable but unforeseen.

Yet the difficulties inherent in describing and quantifying risk do not remove the responsibility of management in the public and private sectors to form a proper assessment of risk and to act accordingly, by avoiding unjustified risks and being prepared for the potential consequences of unavoidable or acceptable risks.

If the recent global and financial and economic crisis has highlighted the fact that risk is unavoidable in modern business, it has also highlighted the danger of believing that the mechanical management of risks by means of novel financial instruments or, worse still, by creative compliance with regulations and codes of practice, without taking proper account of global risk, is an acceptable alternative to the proper analysis of risk and the acceptance of the full consequences of misjudging those risks. It may also be said that it has highlighted a worrying difference between the treatment of high-profile totemic multinationals whose failure is deemed too embarrassing to national governments and the treatment of small and medium sized enterprises (SMEs) whose owners and employees are expected to suffer in silence in the face of all risks, regardless of whether those risks fall within their own control, that of other SMEs or that of highly paid lenders, vendors and purchasers in government-protected firms.

The threats to which SMEs are exposed, however, make it all the more imperative that they do whatever they can to manage those risks. Thomas Henschel's researches on risk management of SMEs, part of which we publish here, are therefore extremely welcome. It is evident from this research that the quality and style of risk management in German SMEs varies a great deal, not only in terms of the extent of application of established management tools such as the balanced scorecard but also in terms of their integration into project management processes. It is hoped that this paper will contribute to ongoing discussions about risk management in the vital SME sector.

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One vital area of management which is inevitably the subject of risks and uncertainties is the management of human knowledge. The features and uses of knowledge, intellect and human capacity, whether individual or collective, defy straightforward economic analysis, because they are subject to human fallibility and inconsistency, human frailty and mortality. At the social level, the application of knowledge is a prey to character and emotion. The same knowledge or intellect at the disposal of a lethargic dreamer will not produce the same results as if it is in the hands of a driven obsessive with material goals. Likewise, the exercise of the same sum total of intelligence and technology held by a multiplicity of small cells who are jealous of their crafts may not have the same end results as the exercise of the same abilities by a more naturally co-operative society which is prepared to sacrifice some narrower collective advantages at the guild, family or workshop level for the benefit of society as a whole. How to create incentives for the development of the most serviceable forms of knowledge and how the use of such knowledge and access to it is to be managed, with a view to fairness and profit to the individual, the collective unit and the wider public, are complex matters for politicians, lawyers and managers, while the measurement of the potential and actual benefits of knowledge is an intricate question for the economist and the accountant. The economist must also be concerned with the basic structures which can facilitate or impede the development and application of knowledge and with the incentives and disincentives to knowledge development which may be inherent in laws, contracts and working environments.

Innovation and knowledge transfers now form a substantial area of social and economic activity. This is especially true in high-tech scientific companies which are involved in the exchange of knowledge with the higher education sector. We here publish a paper by Dai Yun which explores the mechanisms for knowledge transfer between universities and biotechnology companies. The channels for knowledge transfer are varied, including personal contacts and consultancy agreements and may be used at any stage in the product development process. The goodness of the technological fit between academic expertise and company plans, the quality of communication between partners and the level of commitment shown by both sides are the most important success factors in knowledge transfers.

The linked banking and economic crises of the last two years have also highlighted another management issue for industry and government in the management of one of the world's most powerful intangibles: money. Money as a measure of obligations and rights provides a powerful tool for the allocation of resources between competing enterprises and between competing groups of workers, making it an attractive target for manipulation, by governments and speculators as much as by fraudsters. The provision of money and the matching of the money supply to the supply of goods and services is a process in which governments and central banks may have a leading role but in which retail banks card issuers and sellers of goods and services on credit are all involved. At the same time, these providers of money and credit may compete within the same currency area or within zones with managed currency exchange rates or with floating currencies. They may compete on the basis of interest rates, credit timescales and levels of service. The management and regulation of banking and credit and the management of the national currency are major issues in the management of a national economy which is open to the outside world.

John Adams and Karlo Jouan examine the order of events in financial liberalization in emerging markets. Based on an extensive review of the literature, they conclude that

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the sequencing of orderly liberalization measures is important, with the deregulation of inter-bank lending rates preferably preceding the liberalization of deposit rates. In addition, they propose that domestic banking reform and the introduction of competition within national boundaries should precede the opening of the sector to foreign competition, in order to allow the development and maintenance of a viable banking industry within the country to support economic growth and the efficient allocation of resources.

We welcome submissions on all areas of business and economics, including development economics, environmental sustainability, risk management, macroeconomics and government policy, business economics, accounting and auditing.

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Typology of Risk Management Practices: An Empirical Investigation into German SMEs

Abstract

The business management literature has largely neglected the theme of risk management for SMEs. So the aim of this research was to explore the current state of risk management in German SMEs. Derived from a comprehensive analysis of a questionnaire survey which was supported by research interviews, a multidimensional scoring approach to assess a firm' risk management sophistication has been developed. The present approach does not, as usual, evaluate one single scoring figure. Instead it allows a differentiated assessment by evaluating separate scoring figures for each aspect a holistic risk management system should cover. Based on the scoring approach, this paper introduces a new typology of risk management practices. Making the Miles and Snow organizational typology applicable to assess risk management practices, three sophistication types named reactor, defender/prospector and analyser are extracted. Each of the three risk management types is described by its determinants with respect to the components of a holistic risk management. Then recommendations are formulated which actions a firm of the respective type should take to improve its risk management.

Keywords: Holistic Risk Management, Project Risk Management, Business Planning, Performance Measurement, Small to Medium-sized Enterprises, Scoring, Typology.

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1. Introduction

Concerning the current state of risk management in German Small to Medium-sized Enterprises (SMEs) there are no substantial findings (Kirchner, 2002, Gleißner et al., 2004, Arnsfeld et al., 2007). The national and international literature also offers only a few proposals how a risk management suitable for SMEs could be designed (ICAEW, 2005). This fact is often explained by risk management being a very young branch of business management theory which has yet not developed standards (see, for example, Alquier and Tignol, 2006, p.277, Hoitsch et al., 2006, p. 69).

Much uncertainty in SMEs has been provoked by Basel II, the new international equity capital regulations on lending by banks. In connection with the evaluation and

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rating process borrowers are subject to, Basel II demands from the banks to make an assessment as to how the companies deal with the opportunities and risks presented by their development.

The Basel II regulations do not explicitly demand to establish a comprehensive and strictly formalized risk management system (see Basel Committee on Banking Supervision, 2003). Nevertheless, when rating an SME, the lending bank will assess the management accounting instruments and the abilities of management. This covers to determine whether a risk management system has been implemented to a certain extent and whether replacement regulations have been fixed (Füser and Heidusch, 2002, p. 61).

A risk management system is, however, necessary for SMEs, not only because it is required by law or by the Basel II regulations, but rather because it is in the essential interest of the SMEs. The reason is that such enterprises have a high potential to become insolvent and the most frequent causes of insolvency are management errors and weaknesses in the company structure. This is especially true during the first 7 years following the establishment of the company (Günterberg and Kayser, 2004; Almus, 2004).

To classify SMEs, the European Union utilizes the grouping definition shown in Table 1.

Table 1: Small and Medium-sized Enterprises: EU Subclasses

Subclass	Number of employees	Annual turnover (€ million)	Balance sheet total (€ million)
Micro firm	< 10	≤ 2	≤ 2
Small firm	< 50	≤ 10	≤ 10
Medium-sized firm	< 250	≤ 50	≤ 43

Source: Commission of the European Communities (2003)

To belong to one of the classes micro, small and medium-sized, a firm must fulfil the following conditions:

- The number of employees lies below the respective threshold in Table 1.
- Furthermore, at least one of the thresholds for annual turnover and balance sheet total is met.
- The "legal independence criterion" must be fulfilled: A maximum of 25 percent is owned by one or more companies which themselves do not match the threshold conditions of No.1.

The above definition has been valid since 2005 and is updated in terms of annual turnover and balance sheet total at longer intervals of time (Commission of the European Communities, 2003).

From the international perspective there are major differences in the meaning of the criterion number of employees. While for example in the United Kingdom a company only with fewer than 250 employees is considered to be an SME, in the United States of America the figure increases to 500 employees (Dana, 2006, p. 3).

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In order to ensure comparability with other research results, the EU size class definitions for SMEs will be taken as a basis in this paper. Further, an additional class from 250 to 499 employees will be included as size measure.

The aim of this study is to investigate the current state of risk management practices in German SMEs and to give an understanding of what the main barriers are that stand in the way of implementing such a system.

The investigation is carried out with the aid of a questionnaire. The questionnaire results are deepened by research interviews with selected enterprises. Since not all questioned firms are project-oriented the analyses must distinguish between the case of general risk management and – for a smaller number of participants – and the case of project risk management.

A fundamental step in assessing the quantitative empirical findings is the construction of a set of scoring variables. In a transparent, comprehensible and flexible way they represent the aspects of what, in the author's opinion, makes up a holistic risk management. This "multidimensional" scoring approach, allowing for evaluation of risk management practices in a comprehensive and compact way, is a new contribution.

Based on the set of scoring variables, a typology to characterize risk management practices will be introduced. The new approach follows the well-known typology of Miles and Snow (1978) which will be made applicable and operationalized for the purpose of the aspects of risk management. By grouping similar outcomes of "scoring patterns", three types of risk management practices will be extracted: the reactor type, the defender/prospector type and the analyser type.

For each of the introduced types of risk management practices propositions will be formulated how to overcome their respective risk management deficiencies.

2. Literature Review

The literature reveals that risk management is still in an early phase of development and that no standard for SMEs has yet become established which would describe how a comprehensive risk management should appear (cf. Troßmann and Baumeister, 2004, p.80). There is also little in the existing SME literature on actual implementations and risk management methods, and as a result this aspect is covered in more depth by current research projects (ICAEW, 2005, p.5; O'Hara et al., 2005, p.32, Berry et al., 2007).

The research work carried out to date on risk management in SMEs can be grouped into the following main themes: One area is the management of financial risks and the insurance coverage of SMEs, which has already been more heavily researched (cf. Deakins and Bentley, 1995). The other area is the attitude of SMEs towards risk (see Janney and Dess, 2006; Watson and Robinson, 2003; Sparrow and Bentley, 2000; Smallman, 1996).

It is generally accepted that the risk management process basically consists of the following four steps (see Vaughan and Vaughan, 2001):

- Identification of risks

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- Quantification and thus evaluation of risks
- Management and control of risks
- Continued reporting on the development of risks

As part of the organization of risk management the company management therefore has to set out the basic strategies for risk management and to nominate the personnel in the company to be responsible for the steps risk identification, evaluation and control.

Smallman (1996, p. 15) argues that a holistic risk management is characterized by three main aspects.

The first aspect is a continuous monitoring of all sources of risk. Here special attention should also be given to what are termed weak signals. Information on risks should be gathered together from the most diverse sources and in particular from the customer and market perspectives.

The second aspect is the combination of qualitative and quantitative techniques on risk assessment and risk monitoring. Since to some extent qualitative (i.e. non-financial) risks also play a large role in the risk fields, it is not possible to concentrate only on probability theory and actuarial models. Just as equally must qualitative techniques such as scenario planning or other qualitative instruments be applied here. Nowadays (2009) the literature on modern performance measurement techniques (such as Balanced Scorecard or shareholder value) emphasizes their application for risk management purposes (see for example, Wolf, 2003, p.85; Scholey, 2006).

The third aspect concerns the organizational learning where one learns from past errors and disasters and where a culture is established in the company allowing for a positive approach to dealing with mistakes and does not punish employees for mistakes. In this way a knowledge management within the company can also be employed for the purposes of risk management. On top of this one should take into account the company's culture and leadership structure, in particular the management behaviour in SMEs (Janney and Dess, 2006; Richbell et al., 2006).

A specific feature of a project-based organization is that the management of single projects, the management of a network of internal and external projects and the relationships between the company and the single projects must be co-ordinated (Andersen and Jessen, 2003, p.457, Leopoulos et al., 2006).

The author of the present study estimates a sound business planning to be vital for managing risks. It is an important step in the direction of a good risk management, allowing the determination of the impact of risky issues on the firm's target figures profit and liquidity.

The following Figure 1 assembles the aspects which, according to the author of this paper, a comprehensive risk management should cover. Typologies to classify firms are not unknown to the literature. They mainly deal with organizational behaviour and strategy formulation. The present study investigates risk management practices. So it is only natural to develop a variant of a typology approach to classify types of risk management practices.

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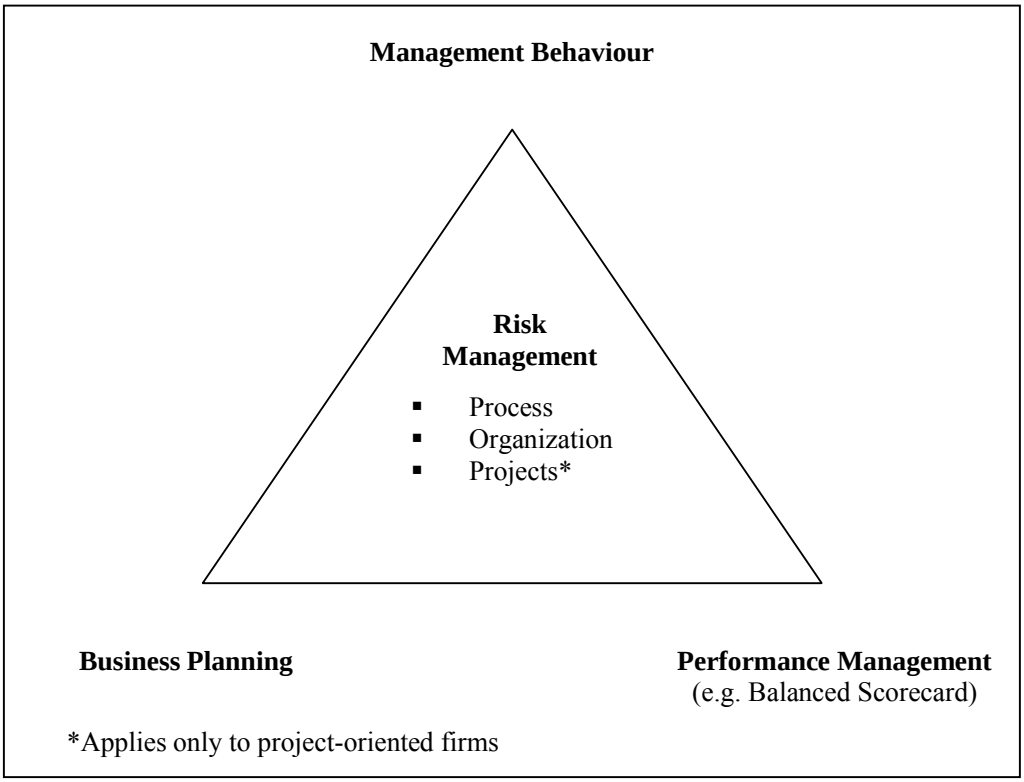
Figure 1: Holistic Risk Management



If typologies known from the literature treat risk issues at all, they rather aim at psychological components, such as the managers' risk taking behaviour. A typology covering to at least some extent the aspects of a holistic risk management as this paper supports does not exist.

Table 2 assembles the main sources that have influenced the approach of the present study.

Miles and Snow's approach is the typology that has most frequently been validated empirically (see also Schachner et al, 2006, p.604; Laugen et al., 2006). It introduces four types named as:

- Reactor
- Defender
- Prospector
- Analyser

These four types constitute a manageable number of groups that can be well differentiated by the criteria Miles and Snow present. Explicit assessment of risk management does not occur; merely the managers' risk taking behaviour is treated in a rather wholesale manner (Miles and Snow, 1978).

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Table 2: Business Strategy Typologies: Main Literature Sources

Author / Research focus	Key findings
1. Miles and Snow (1978, 1984, 2003) Fit among an organization's strategy, structure and management processes: Mail questionnaires and interviews (USA).	Suggest four types of organizational strategy: reactor, defender, prospector and analyser.
2. Smallman (1996) Relationship between risk strategy and organizational structure: Addresses micro, small, medium and large firms. Proposes field research programme by questionnaires and case studies (UK).	Uses Miles and Snow's typology and combines it with the polarized classification of risk management attitudes, i.e. the fatalistic and holistic approach. Up to now (2009) the proposed research has not been carried out.

As Gimenez (2000) states, the Miles and Snow typology is especially suitable for classifying SMEs strategic behaviour. In the small business context one can find all four strategic types proposed in the Miles and Snow's model (p.243). Gimenez also mentions that because of its simple and transparent description the Miles and Snow typology can easily be transferred to other research areas (p.237).

Smallman (1996) draws on the typology of Miles and Snow and associates their company types to the risk paradigms "reactive risk management" and "proactive risk management". Reactors and defenders are classified with respect to risk management as being "reactive" and prospectors and analysers as "proactive."

Smallman announces a comprehensive research programme (questionnaires, interviews), addressing micro, small, medium and large firms. It must be criticized that Smallman's research model does not contain any operationalization how to assess risk management types. It is not described how the state of risk management (process and organization) must look like to fit with one of the types being considered. Issues of project risk management have not been taken into account at all. The literature review has revealed that until now (2009) Smallman's research programme has not been carried out.

By analysing the empirical results, the present investigation uses a modified form of the Miles and Snow approach to identify types of risk management practices.

3. Methodology and Research Design

At the time of the investigation in 2004, only little data was available on the state of risk management in German SMEs. This gave rise to the decision to determine current risk management practices in German SMEs by an explorative approach. It war carried out by a postal questionnaire, followed up and deepened by research interviews.

First, the postal questionnaire asked for basic information about the enterprise (for the demographic data see Table 5):

- Size by annual turnover
- Size by number of employees
- Industrial sector
- Legal form

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- Whether part of a group
- Whether audited
- Whether early warning system established

The remaining questions cover the aspects of a holistic risk management as described in Figure 1: business planning, performance measurement, risk management process, risk management organization and – if it applies – project risk management. All issues which are used for the multidimensional scoring approach are displayed verbatim in Table 3, together with the questionnaire options to be selected.

After having analysed commercial address databases for drawing the sample, the decision was made to work with the Hoppenstedt (2004) CD-ROM database for German SMEs. This is a well-known and annually updated database containing information about c. 65,000 German SMEs, the largest SME database with an over-regional focus. It is oriented towards the European Union definition of SMEs, and the firm profiles contain all essential quantitative information.

By the technique of cluster sampling, all enterprises with a number of employees up to 250 and an annual turnover up to €50 million were selected from the Hoppenstedt database within the following industries:

- Construction
- Engineering
- Information Technology
- Auditing/consulting/training
- Trade/service/logistics

According to the Value Added Tax statistics (2007), theses sectors make up 70.5% of all SMEs in Germany. Moreover, firms of the selected industries are most likely to be project-oriented. The selection process resulted in a total sample of 1,801 firms.

The effective response rate of 17.4% (314 utilizable questionnaires had been returned) resulting from a single mail shot can be considered as satisfactory. The average response rate of empirical studies on SME risk management practices goes from 8% to 17% (see ICAEW, 2005, pp.6-7).

In addition to the questionnaire survey, 38 in-depth research interviews were held in 2005 and 2006. Nearly one third of the interviewed firms had also previously participated in filling in the questionnaire survey. Apart from an extended set of demographic variables, some additional variables are available, describing in several ways uncertainty in the business environment. Specific for the interview approach is the possibility to go into qualitative issues in-depth. Special emphasis will be on examining their management behaviour.

Essential issues of the questionnaire results will be used to construct a set of scoring variables, each of them reflecting one of the aspects of a holistic risk management. The construction performed has been validated by the results of the research interviews.

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The following comments briefly explain the principles of constructing the scoring variables from the underlying scoring summands and the definition of the associated scoring classes.

Scoring summands: A scoring summand represents the score value of one particular question of the questionnaire. Responses of the type "Yes/No" or "Yes/Partly/No" have an inherent rank and were encoded reflecting this rank. Concerning issues with multiple response the simplest form of deriving a scoring summand is the counting measure: If n options had been ticked in the questionnaire, the scoring summand is given the value n. Simply counting the number of selected options means that all options are considered to have the same "value". If in contrast to that an option is estimated to have particular meaning it will be given an increased value of 2 or more instead of the "normal" value 1.

Scoring variables: In its simplest form, a scoring variable is defined as the sum of the corresponding scoring summands. There are two reasons to deviate from simple sums by applying weighting factors: If a scoring summand has a relatively small range compared to the other summands, a weighting factor is applied to compensate. Furthermore, if the contribution of a scoring summand is judged to be of particular importance for the score of the respective risk management aspect, it will be given a weighting factor of 2 or more.

Scoring classes: Due to their origin, the scoring variables have different and therefore non-comparable ranges. To overcome this difficulty, the ranges of all scoring variables are simply subdivided into three intervals of equal length, named the "low", "moderate" and "high" scoring class. It should be noted that "range of a scoring variable" means the set of values between the variable's theoretical minimum and its theoretical maximum, not its empirical range when regarding the scores of a sample. In this manner, the scoring ranges become comparable. The analyses will reveal that a finer gradation does not seem to be appropriate; for example, risk management organization and performance measurement do not show an adequate (empirical) scoring range for further differentiation (see Table 5).

The scoring approach evaluates separate scores for the main topics considered as important (see Figure 1):

- Business planning
- Performance measurement
- Risk management process
- Risk management organization
- Project risk management (if it applies)

This scoring approach allows the sophistication of a risk management system to be classified by a set of four or five scoring attributes (in the cases of general risk management or project risk management, respectively). The set of scoring attributes assessing a firm's risk management practices forms a specific pattern, with each of the components varying in the range low–moderate–high.

The scoring outcomes will be taken as a base to derive a typology for risk management practices. As a result of an overall analysis of the questionnaire and

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research interview findings, general descriptions of the determinants of risk management types will be presented. Dependent on its low–moderate–high scoring pattern, each firm can then be assigned to one of the following types:

- Reactor
- Defender/Prospector
- Analyser

In the following sections, Miles and Snow's scheme (1978) with the originally separate types "defender" and "prospector" is reduced to a classification of businesses into three types. As justified by the scoring approach, for an assessment of each of the risk management components three classes or categories are adequate. Extending this 3-category differentiation to the overall assessment of risk management capability by simultaneous consideration of the single risk management components led to the merging of the two central types of Miles and Snow into one, called the defender/prospector type. Thus the original four have been reduced to the above three types:

A risk management type assembles firms with similar scoring patterns. This similarity is not defined in a mathematical way; it is due to a classification by the investigator, according to the general type descriptions (Tables 6 to 8).

The classification of the risk management types will make use of the scoring classes derived from the scoring variables. The type descriptions have been derived from the questionnaire and interview findings, with regard to the various aspects of a holistic risk management. To extract a description of a type determinant, formal scoring evaluations have been brought together with an overall assessment of selected questionnaire and all interview cases. The assessment has been carried out by an in-depth personal inspection of a randomly drawn subsample of 65 of the original 314 evaluated questionnaires and by an in-depth analysis of the transcripts and notes of all 38 interviews.

4. Findings and Implications

Grouped into the four or five aspects of general or project risk management, Table 3 presents the parts of the questionnaire which inquire the firms' risk management practices. The encoding of the respective 17 (general risk management) or 23 (project risk management) variables – the so-called scoring summands – has been carried out as indicated by the score column. If the options to be selected reveal an inherent order, the scores will reflect it with values from "bad" to "good". In addition, options with particular importance for a comprehensive risk management have been given an increased score. The table also shows the rank of the selected options, according to the questionnaire results.

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Table 3: Risk Management Practices: Questionnaire Issues and Scoring

Question		Option	Rank**	Score
	Business Planning			
Q 1.7a*	Which budgeting system do you use for your long-term business planning?	Budgeted profit statement	1	1
		Cash budget	2	1
		Budgeted balance sheet	4	1
		Master budget	3	5
		Other planning	6	1
		No statement	5	0
Q 1.7b	How many years into the future do your long-term business plans extend?	1 year	2	1
		2 to 3 years	1	2
		4 years or more	3	3
		No statement	4	0
Q 1.8*	Which budgeting system do you use for your short-term business planning?	Budgeted profit statement	1	1
		Cash budget	2	1
		Other planning	3	1
		No statement	4	0
	Performance Measurement			
Q 3.1	Do you use the Balanced Scorecard for performance measurement?	Used	3	
	If "Yes": Do you use the Balanced Scorecard for risk management?	Used for risk management		4
		Not used for risk management		2
		Planned to use	2	1
		Not planned to use	1	0
Q 3.2	Do you use shareholder value for setting business targets or evaluating performance?	Used	2	
	If "Yes": Do you use shareholder value in risk management?	Used for risk management		4
		Not used for risk management		2
		Planned to use	3	1
		Not planned to use	1	0
Q 3.3	Do you use a knowledge management system?	Used	2	
	If "Yes": Do you use the knowledge management system in risk management?	Used for risk management		4
		Not used for risk management		2
		Planned to use	3	1
		Not planned to use	1	0
	Risk Management Process			
Q 2.3*	In which risk categories do you evaluate risks?	Strategic risks	2	1
		Market risks	1	1
		Legal risks	5	1
		Financial risks	4	1
		Group company risks	7	1
		Corporate governance risks	6	1
		Business process risks	3	1
		Other risks	8	1
Q 2.5a	How often are risks identified and evaluated?	Every year	2	1
		Every 6 months	3	2
		Every 3 months	1	3
		Every month	5	4
		Other period	4	0
Q 2.5b	What time horizon is considered when risks are reviewed?	1 year	1	1
		2 years	2	2
		3 years	4	3
		5 years	5	4
		Open	3	0
Q 2.6a	How is the board of directors informed about risks?	Separate risk reporting	2	3
		Risk reporting part of general reporting	1	1
		Other reporting	3	1
Q 2.7	Is risk management linked to business planning?	Direct integration of risk figures	2	2
		No direct integration of risk figures	1	1
		No link to the business planning system	3	0

*Multiple selection allowed. In this case the total score is calculated as the sum of the single scores of the selected options.
**According to the questionnaire results.

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Table 3: Risk Management Practices: Questionnaire Issues and Scoring (Continued)

Question		Option	Rank**	Score
	Risk Management Organization			
Q 2.1a*	Who is responsible for your risk management?	Board of directors	1	1
		Internal audit	8	2
		Designated risk manager	7	2
		Chief financial officer	3	1
		Head of accounting function	4	1
		Controlling function	2	1
		Staff of business units	5	1
		Other	6	1
Q 2.1b*	Who supervises and reviews your risk management system?	Board of directors	1	1
		Internal audit	5	2
		Controlling function	2	1
		Self-control of business units	3	1
		Other	4	1
Q 2.2*	How are the practices of your risk management disseminated?	Risk management manual	4	4
		General procedural manual	1	1
		Controlling manual	3	1
		Other	2	1
Q 2.4*	How are your risks identified and evaluated?	By management alone	2	1
		By management together with functions	1	1
		By internal audit	7	1
		By controlling function	2	1
		By workshops with business units	6	1
		By designated employees of business units	4	1
		Inquiries by questionnaires or check lists	5	1
		Other way	8	1
Q 2.8*	Which kind of software do you use for your risk management?	Standard office software	1	1
		Standard business management software	2	1
		Special risk management software	4	2
		In-house software	3	1
		Other software	5	1
Q 2.9	Which amount of investments for your risk management do you plan?	No investments planned	1	0
		Less than € 25,000	2	1
		From €25,000 to €50,000	3	2
		More than €50,000	4	3
	Project Risk Management***			
Q 4.2	Are there separate business plans for single projects?	For every project	1	2
		Only for some projects	2	1
		For no project	3	0
Q 4.3	Are the business plans of your single projects integrated into the business planning of your entire business?	For every project	1	2
		Only for some projects	2	1
		For no project	3	0
Q 4.5*	Which risks do you consider for single projects?	Legal risks	5	1
		Design and construction risks	3	1
		Operational risks	1	1
		Financial risks	2	1
		Personnel risks	6	1
		Quality risks	4	1
		Environmental risks	7	1
		Other risks	8	1
		No statement	9	0
Q 4.6*	Where is information about risks for individual projects recorded?	In contract documents	1	1
		In project cost calculations	1	2
		By project controlling	3	2
		In a project database	4	2
		Other way	5	1
		No statement	6	0
Q 4.7	Are your single project risk evaluations integrated into the business planning of your entire business?	For every project	2	2
		Only for some projects	1	1
		For no project	3	0
Q 4.8	Do you consider good/normal/bad assumptions ("scenarios") for your single project figures to determine the effects of project risks on the development of your entire business?	For every project	3	2
		Only for some projects	1	1
		For no project	2	0

*Multiple selection allowed. In this case the total score is calculated as the sum of the single scores of the selected options.
**According to the questionnaire results.
***Applies only to project-oriented firms.

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The principles of constructing scoring variables from the scoring summands and the derivation of scoring classes have been introduced in the section on Methodology and Research Design (Section 3).

Table 4 summarizes, for the four (or five, respectively) aspects of a holistic risk management, the construction of the respective scoring variables. One should in particular note the weight column which expresses how a scoring variable is defined as a linear combination of the underlying scoring summands. It also displays the theoretical and empirical values for maximum and minimum scores and the low, moderate and high scoring classes.

Table 4: Scoring Variables: Construction and Descriptive Statistics

Scoring summands			Theoretical							Scoring classes		
	Scoring variable	N	Min	Max	Min	Max	Mean	StdDev	Weight	Low	Mod.	High
Q 1.7a	Long-term pl.: Components	276	0	6	0	6	2.66	1.714	1			
Q 1.7b	Long-term pl.: Time horizon	276	0	3	0	3	1.96	0.718	1			
Q 1.8	Short-term planning	276	0	3	0	3	1.63	0.615	1			
	sc_plan	276	0	12	0	11	6.26	2.138		0-3	4-7	8-12
Q 3.1	Balanced Scorecard	280	0	4	0	4	0.61	1.146	1			
Q 3.2	Shareholder value	280	0	4	0	4	0.57	1.092	1			
Q 3.3	Knowledge management	280	0	4	0	4	0.76	1.282	1			
	sc_perf_rm	280	0	12	0	12	1.95	2.411		0-3	4-7	8-12
Q 2.3	Risk categories	281	0	8	0	7	3.08	1.368	1			
Q 2.5a	Risk assessment: Frequency	281	0	4	0	4	2.14	1.221	1			
Q 2.5b	Risk assessment: Time horizon	281	0	4	0	4	1.43	1.005	1			
Q 2.6a	Risk reporting to board of dirs.	281	0	3	0	3	1.12	0.712	1			
Q 2.7	Link of r.m. to bus. planning	281	0	2	0	2	1.09	0.772	3			
	sc_rm_proc	281	0	25	2	21	11.04	3.788		0-8	9-16	17-25
Q 2.1a	Respons.: R.m. implementation	282	0	10	1	7	2.03	1.152	1			
Q 2.1b	Respons.: R.m. reviewing	282	0	6	0	5	1.54	0.736	1			
Q 2.2	Risk management documentation	282	0	7	0	6	1.23	1.324	1			
Q 2.4	Risk assessment: Respons./meth.	282	0	8	1	6	1.79	0.856	1			
Q 2.8	Risk management software	282	0	6	0	4	1.35	0.735	1			
Q 2.9	Risk management expenditure	282	0	3	0	3	0.61	0.837	2			
	sc_rm_org	282	0	43	3	26	9.17	3.728		0-14	15-28	29-43
Q 4.2	Project business plans	230	0	2	0	2	1.50	0.567	2			
Q 4.3	Consolidation of proj. plannings	230	0	2	0	2	1.48	0.574	2			
Q 4.5	Risk categories for projects	230	0	8	1	7	3.62	1.569	1			
Q 4.6	Project risk documentation	230	0	8	0	7	3.04	1.587	1			
Q 4.7	Project risk integr. into planning	230	0	2	0	2	1.25	0.587	3			
Q 4.8	Project risk scenarios	230	0	2	0	2	0.82	0.530	2			
	sc_prm	230	0	34	3	31	18.00	4.957		0-11	12-22	23-34

Since many enterprises have not answered every question, the total N of Table 4 varies; for each scoring variable it is determined as the maximum number of firms, for which all underlying scoring summands are defined. The significant decrease for the variable sc_prm is explained by the fact that not all investigated enterprises are project-oriented.

Referring to the scoring variable means and the corresponding scoring classes, it is worth noting that the mean score of risk management organization and of performance measurement fall in the “low” class, while the remaining means belong to the “moderate” class.

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Having presented the construction of the scoring variables, it is now discussed whether there are significant differences between their means on the classes induced by the demographic basic variables (see Table 5).

Table 5: ANOVA for Scoring Variables with Respect to Demographics

		sc_plan		sc_perf_rm		sc_rm_proc		sc_rm_org		sc_prm	
		Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Size by annual turnover (Q1.5)											
Micro	(up to €2 million)	5.00	17	1.74	19	11.05	20	6.76	21	18.33	15
Small	(€2 million to €10 million)	6.37	158	1.76	161	11.05	161	8.85	162	18.21	136
Medium	(€10 million to €50 million)	6.31	78	2.32	77	10.96	78	10.05	75	17.53	66
Large	(more than €50 million)	6.20	5	1.40	5	8.50	2	9.40	5	19.00	1
No statement		6.28	18	2.39	18	11.50	20	11.05	19	17.83	12
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
F Ratio		1.600		0.971		0.304		5.028		0.234	
Significance p		0.174		0.424		0.875		0.001		0.919	
Size by number of employees (Q 1.6)											
Micro	(up to 9 employees)	4.31	13	1.60	15	9.40	15	6.47	15	17.73	11
Small	(10 to 49 employees)	6.06	35	1.79	39	11.65	40	8.90	42	18.59	37
Medium	(50 to 249 employees)	6.36	215	1.94	214	11.07	214	9.19	214	17.96	177
Large	(250 to 499 employees)	7.08	13	3.00	12	10.50	12	13.64	11	15.80	5
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
F Ratio		4.684		0.918		1.374		8.614		0.517	
Significance p		0.003		0.433		0.251		0.000		0.671	
Industrial sector (Q 1.1)											
Construction		5.84	80	1.49	79	10.63	80	8.54	80	17.49	73
Engineering		6.59	93	2.16	98	11.06	100	9.46	98	19.04	77
Information technology		6.54	39	2.77	39	12.11	37	9.53	40	17.50	36
Auditing/consulting/training		5.57	28	2.41	27	10.60	30	8.28	29	18.30	23
Trade/service/logistics		6.56	36	1.14	37	11.18	34	10.17	35	16.52	21
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
F Ratio		2.454		3.440		1.090		1.886		1.633	
Significance p		0.046		0.009		0.362		0.113		0.167	
Legal form (Q 1.2)											
Unincorporated firm		5.92	51	2.14	57	10.64	55	8.67	55	17.09	47
Incorporated firm		6.33	225	1.90	223	11.14	226	9.30	227	18.24	183
Total		6.26	276	1.95	280	11.04	281	9.17	282	18.00	230
F Ratio		1.549		0.462		0.772		1.235		2.041	
Significance p		0.215		0.497		0.380		0.267		0.155	
Part of a group (Q 1.3)											
Yes		6.71	104	2.16	105	10.85	105	9.72	106	17.82	90
No		6.00	171	1.79	173	11.19	174	8.87	174	18.18	139
Total		6.27	275	1.93	278	11.06	279	9.19	280	18.04	229
F Ratio		7.367		1.570		0.532		3.434		0.285	
Significance p		0.007		0.211		0.466		0.065		0.594	
Audited (Q 1.4)											
Yes		6.51	212	2.01	212	11.23	212	9.73	212	18.08	171
No		5.40	60	1.71	63	10.47	66	7.46	67	17.84	56
Total		6.27	272	1.94	275	11.05	278	9.19	279	18.02	227
F Ratio		13.290		0.722		2.028		20.156		0.100	
Significance p		0.000		0.396		0.156		0.000		0.752	
Early warning system established (Q 1.9a)											
Established		6.55	182	2.12	175	11.91	188	9.98	189	19.09	145
Planned		6.09	66	2.10	70	9.09	57	8.52	60	15.84	55
Not planned		4.62	26	0.76	34	9.30	30	5.75	32	16.50	24
Total		6.26	274	1.95	279	11.04	275	9.19	281	18.01	224
F Ratio		10.279		4.791		17.396		21.709		10.784	
Significance p		0.000		0.009		0.000		0.000		0.000	

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Company size (Questions 1.5/1.6): Size with respect to turnover (Question 1.5) reveals significant differences only for scq_rm_org. On the average, micro and small firms have smaller scores with respect to risk management organization. It is interesting, that firms that gave no turnover response have the best scores.

Regarding size with respect to the number of employees (Question 1.6), the mean scores for business planning and risk management organization appear with significant differences. For both scoring variables, micro and small firms perform more badly than medium-sized and large firms.

Industrial sector (Questions 1.1): Significant differences appear only with respect to the scoring variables for planning sophistication and instruments of performance measurement. Generally, scq_rm_org has bad values within all industrial sectors, with the trade sector still having the highest values. Concerning scq_plan, engineering, IT are leading, and audit comes last. IT ranks first in the use of instruments of performance measurement, followed by engineering. Here trade comes last.

Legal form (Question 1.2): Incorporated firms have higher mean scores than unincorporated ones, with the exception of the performance measurement variable. This may be due to the fact that, to fulfil the legal requirements, incorporated firms need more detailed risk information for their annual accounts.

Part of a group (Question 1.3): Firms that are part of a group have better mean scores for planning and risk management organization. Especially for risk management organization this result certainly reflects the influence of the group parent.

Audited (Question 1.4): Firms the annuals accounts of which are audited demonstrate significant higher mean scores with respect to planning and the organization of risk management. Firms that are audited clearly benefit from the knowledge of chartered accountants and their requiring of a risk management system being established in order to get an unqualified audit opinion.

Early warning system established (Question 1.9a): All five scoring values have significant different means, with the firms having established an early warning system resulting in the highest respective mean.

The scoring approach has shown that for SMEs it is meaningful to work with both size criteria: annual turnover and number of employees. The scoring means differ significantly with respect to industrial sectors. Moreover, a certain positive influence due to being part of a company group can be recognized.

Based on a set of four or five scoring variables, respectively, which assess the aspects of a holistic risk management approach, now types of risk management practices shall be extracted. The verbal descriptions of the Tables 6 to 8 are the result of an intensive analysis of the questionnaire results and the deepening research interviews. The aim was, by evaluating the scoring variables (see Table 4) and by grouping similar scoring patterns, to derive three categories of risk management sophistication. All considerations are carried out for both cases of general and of project risk management.

In the case of general risk management, a sample object has a complete scoring pattern, if simultaneously the four scoring variables sc_plan, sc_perf_rm, sc_rm_proc and sc_rm_org are defined, making up a total number of 219 firms. If in addition an

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enterprise is project-oriented, for a scoring pattern of project risk management it is required that also the fifth scoring variable sc_prm covering project-specific issues is defined; in this case it leads to a total of 166 firms. For the individual totals of the single scoring variables see the varying N in Table 4.

Each of the Tables 6 to 8 informs about die five most frequently occurring scoring patterns ("Top Five") of the respective type of risk management practices, for both the cases of general and of project risk management It displays the absolute frequency number and the percentage, related to the totals N = 219 and N = 166. It is pointed out that, when grouping similar scoring patterns to form a type, those patterns occurring with frequency 1 have been neglected (for their totals see Table 9).

The type extraction was carried out by an intensive inspection of the firms' scoring patterns where the components reveal more or less deficiencies. After discussing the Top Five of the respective risk management type, the following sections will present propositions how the deficits being characteristic for this type could be overcome.

Reactor Type

The assessment of the reactor type of risk management practices and the Top Five of the corresponding scoring patterns is presented in Table 6.

The most frequently occurring scoring pattern associated with reactor type firms is (M, L, M, L) (25.1%); this is also the overall most frequently occurring one (see Tables 7 and 8). Business planning has an average value. Systematic methods of performance measurement are hardly applied. Risk management is still in its infancy; the risk management process has not been comprehensively established, the risk management organization has few formal regulations.

Rank 2 among all firms with a share of 15.1% is occupied by the reactor pattern (M, L, L, L) and also, with average business planning and the remaining scores being low. These firms have not dealt with the subject risk management to a greater extent.

Together both reactor patterns make up more than 40%.

Generally, in the case of general risk management, performance measurement and risk management organization of the reactor type are developed badly, while business planning and risk management process show slightly better outcomes.

For firms which deal with projects, the most frequently occurring reactor pattern is (M, L, L, L, M) (10.8%). Among all firms, this has only rank 2 (for rank 1 see Table 7). This patterns reveals some of the typical reactors outcomes for project risk management: as in the general case, performance measurement and risk management organization show low scores, business planning and risk management process are better (but the latter less developed than in the general case), and the specific project risk management outcomes of the fifth scoring variable are rather average.

As the present investigation has revealed, micro- and small firms are heavily represented in the reactor type. The reactors are often owner-managed firms. The owner-managers mostly have a technical education and qualification. Few of the companies are certified to the ISO/QM standards.

These companies are largely to be found in sectors with low growth and low innovation potential. It would be in one of the main sectors such as construction and

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trade/service/logistics, markets being dominated by intense competition. It is noticeable that banks put an increased pressure on reactors to improve their management systems.

Table 6: Determinants of the Reactor Type and Scoring Pattern Examples

Strategy/Structure		Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management*
Description of Reactor Type Determinants						
Lacks a coherent business strategy. Operates in mature markets. Deficits in business management knowledge by the managing director. Strong reservations against management consultants.		No formal planning methods applied. Mostly, only an annual sales plan is developed. Does not look ahead. Accounts and financial statements are prepared externally.	No sophisticated performance measurement tools in use.	Identifies only very specific risks, which they are familiar with. Short-term risk time horizon. No formal risk reporting procedure.	Little formalization of the responsibilities for risk management, which is concentrated towards the managing director. Informality, no sophisticated risk assessment methods employed. Regulations on replacement and succession are missing.	No classic project planning tools exploited. Exercises for projects only a cost calculation. No formal risk assessment techniques employed. Risk considerations only take place in the proposal phase. The management is not aware of the total risk position the company faces from the projects undertaken.
Top Five of Reactor Type Scoring Patterns: General Risk Management (N = 219)						
55	25.1%	M	L	M	L	
33	15.1%	M	L	L	L	
7	3.2%	L	L	L	L	
5	2.3%	L	L	M	L	
2	0.9%	L	M	M	L	
102	46.6%					
Top Five of Reactor Type Scoring Patterns: Project Risk Management (N = 166)						
18	10.8%	M	L	L	L	M
4	2.4%	L	L	L	L	M
4	2.4%	M	L	L	L	L
3	1.8%	M	L	L	L	H
3	1.8%	M	L	M	L	L
32	19.3%					

L = Low, M = Moderate, H = High
* if it applies

Concerning the implementation of a risk management, the reactor type reveals the largest need for action.

After having described the characteristic scoring patterns which mainly make up the reactor type, propositions are presented for overcoming the deficiencies revealed in the type classification process.

Business Planning

Concerning the components of a business planning system, the reactor should at least implement an annual financial and profit planning. For a monthly monitoring it would be meaningful to prepare a short-term liquidity and profit planning.

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In the first place, reactors – which are often administered by more technically-oriented owners or managing directors – must be persuaded of foresighted planning being advantageous. Reactors should take advantage of professional help by tax advisers.

Performance Measurement

Instruments of performance measurement that are useful to develop a strategy frequently are not known to the reactor or they are dismissed by the management as not being meaningful.

Risk Management Process

To set up a risk management, the reactor type must carry out a systematic and complete assessment of all relevant risk categories. A reactor often has a business organization according to its functions. So the identification of risks should occur along the functional areas. The heads of the functions should be responsible for the risk identification and for a provisional evaluation.

Since reactors have few formalized systems and procedures they will have particular difficulties in establishing a risk management. So only a step by step implementation of the risk management process can be proposed.

Risk Management Organization

The key to a successful implementation of a risk management system is with the managing director or the owner-manager. Risk considerations often take place only in the mind of management while the staff of the responsible functions are not involved. A comprehensive risk management is not possible until the responsibility for risk assessment is delegated to the heads of the functional units. To gain knowledge of risk identification and risk evaluation the training of employees is strongly required.

As a starting point, adequate methods to assess risks are questionnaires and checklists. In a further step towards a comprehensive risk management specific risk assessment templates should be developed.

Another critical point concerning risk management, organizations are lacking contingency and replacement regulations. Reactors mostly have only one managing director who has no one to whom he could hand over responsibility in the case of urgency. In this context there is strong need for action.

Reactors also have rarely thought about succession planning. The death of the owner-manager would have significant consequences. Often within his family there is no potential successor.

Project Risk Management

To control and monitor the projects the application of classic project planning techniques is needed (Project Breakdown Structure, time scheduling, cost and profit planning). The project documentation must strongly be improved. Having no sound project management, reactors need not think about establishing the consolidation of single project developments.

Furthermore, it is recommended that risk assessment should be extended along the whole project life cycle. Reactors often deal with a project causing an essential loss that they do not perceive until the project termination.

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To sum up this type has to undergo major changes in his organizational structure, especially implementing a sound business planning and control structure. Otherwise the survival of the reactor type has to be seen very critical.

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Defender/Prospector type

Table 7 presents the determinants of the defender/prospector type. It is reminded that this type is drawing on the originally separate Miles and Snow types "defender" and "prospector" (Miles and Snow, 1978; see the Literature Review section).

Table 7: Determinants of the Defender/Prospector Type and Scoring Pattern Examples

Strategy/Structure	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management*
Description of Defender/Prospector Type Determinants					
Controls secure market niches. Little or no product-market development. Stress efficiency of operations. Maintains its traditional approach in the face of environmental changes. Takes advantage of external support.	Applies less sophisticated formal planning methods. Long-term and short-term profit and liquidity planning exists. Medium-term planning horizon. Little use of forecasting methods. Accounts and Annual Financial Statements are prepared in-house.	Shows greater openness towards modern instruments of performance measurement (e.g. BSC, shareholder value). Regards the traditional performance measurement systems (such as ROI) they reveal no significant difference in the application of these instruments with respect to the reactor.	Slight improvements, when compared to reactors. Familiar with a narrow set of well-identified risks. Without considering all risks, it can rush into costly failures. Risk reporting and link of risk management to business planning displays major weaknesses.	Initial contingency and replacement planning. Clear weaknesses in the succession planning. Informality, no sophisticated risk assessment methods. Quantitative methods dominating.	Employs easy to use project management tools, such as Gantt charts. No formal application of project risk management tools. Great reliance is placed on experience as a means for risk assessment. Not to be able to determine the total risk position of the entire company.
Top Five of Defender/Prospector Type Scoring Patterns: General Risk Management (N = 219)					
24	11.0%	M	M	M	L
13	5.9%	H	L	L	L
7	3.2%	M	L	M	M
3	1.4%	M	L	H	L
3	1.4%	H	M	L	L
50	22.8%				
Top Five of Defender/Prospector Type Scoring Patterns: Project Risk Management (N = 166)					
34	20.5%	M	L	M	L	M
11	6.6%	M	M	M	L	M
9	5.4%	M	M	M	L	H
8	4.8%	H	L	L	L	M
3	1.8%	M	L	M	M	H
65	39.2%					

L = Low, M = Moderate, H = High
* if it applies

In general risk management, the leading scoring pattern (M, M, M, L) associated with the defender/prospector type, covering 11.0% of the surveyed firms, has the overall rank 3. Three of the four scoring variables indicate medium sophistication. Methods of performance measurement are more formal (or their use is at least planned). Only the risk management organization has considerable deficits.

In the general case, defender/prospectors perform clearly better than reactors with respect to business planning. Performance measurement and risk management process are also better. Risk management organization has still bad outcomes.

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In the project risk management case, with 20.5% the defender/prospector pattern (M, L, M, L, M) is overall leading: It is characterized by medium outcomes of business planning, risk management organization, with low values for performance management and risk management organization and average scores for the component being specific for project risk management.

Concerning project risk management, the project-specific component is again better than the reactor's one. With average scores for the risk management process the defender/prospector performs clearly better than the reactor.

In terms of company size the midway defender/prospector position mainly relates to small firms. It also includes some of the medium-sized firms. The medium-sized firms have undertaken certain steps towards a risk management, but it is not sufficient to consider them as an analyser type.

A main focus in the industry sectors covered cannot be clearly identified here. They are situated in a dynamic external business environment. The competitive situation has become noticeably worse. The companies must compete intensively with new micro and small firms entering the market. In most cases the technology dealt with is mature and no longer has any great potential for further development. The level of education of the managing directors is in most cases a university degree. The companies also make greater use of external support from consultants.

In some cases significant losses have also been experienced. They mainly involved the loss of important customers, losses due to bad debts and failed product developments. The relationship with the bank has noticeably worsened. The bank is now placing significantly more requirements on the business planning and risk management.

When compared to reactors, defender/prospectors have taken the first steps in the direction of a holistic risk management.

It is remarkable that firms which, according to the results of this study, have been categorized as defender/prospector either belong to the low side of the scale, being only slightly better than a reactor, or they were found at the high side, on the way to become an analyser.

The business strategy chosen appears to be practicable in order to ensure the firm's chance of survival. The products and the technology being used have only little potential of development.

How the defender/prospector can further develop in a positive way depends strongly on the rapidity of environmental changes.

Business Planning

In addition to existing financial and profit plannings, the defender/prospector should implement a balance sheet planning. Thus for the external financing by a bank it is very important to keep certain assets and capital ratios. As only few defender/prospectors already work with a master budget they should take greater care of co-ordinating the various subplans.

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Performance Measurement

Defender/prospectors do not apply the classic instruments of performance measurement to an essentially greater degree than the reactor type does. They though exploit them less sporadically.

Concerning modern instruments such as the Balanced Scorecard or the shareholder value, defender/prospectors are more open-minded than reactors. This may be due to more staff working in the accounting or in the business management unit. Further efforts are still needed. In this context, a critical factor is the management accounting function; it should be extended with respect to personnel.

Risk Management Process

The defender/prospector has established the process of risk assessment a little more formally than the reactor type. Most remarkable is that the employees from the functional areas are integrated to a larger extent into the risk management process.

An essential starting point for the further development for the defender/prospector is that risk assessment templates should be designed, allowing a complete assessment of all relevant risk categories. Defender/prospectors often do not assess all risks being essential for them which may lead to substantial losses.

Another approach could be the implementation of a "risk map" or a "risk portfolio", which may deliver to the management a compact presentation of the entire risk position. Just as reactors, defender/prospectors generally do not know their entire risk position.

Risk Management Organization

The employees of the functional units being responsible for risk management must still more intensively be advised to use the risk assessment templates and the methods of risk evaluation.

The controlling function should play a central role for risk management. For external risk management support, the defender/prospector should increasingly fall back on tax advisers and chartered accountants.

The rudimentary steps toward contingency and replacement regulations must further be improved. Succession regulations are widely unsolved.

Project Risk Management

Regarding general project management, the use of simple project management tools distinguishes the defender/prospector from the reactor. For the majority of their single projects, defender/prospectors also carry out a cost planning and a profit planning.

On the other hand, project risk management of defender/prospectors is very much the same as that of reactors so that the same implications apply. Merely the defender/prospector management shows greater insight that there is urgent need for action to improve project risk management.

To conclude the further positive development depends on the dynamic and change in the business environment. A better integration of subplans (in the business planning) can secure the detection of critical developments in time. This will also broaden the

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view for identification of risks the company faces, and that they do not overlook significant risks.

Analyser Type

The determinants of the analyser type of risk management practices are displayed in Table 8.

Regarding general risk management, analysers have an even better business planning than defender/prospectors: almost all leading scoring patterns have high scores. Performance management shows a slight improvement, risk management process is medium to high. Risk management organization still reveals a bad picture. In the case of project risk management, the additional project-specific component displays average scores.

Table 8: Determinants of the Analyser Type and Scoring Pattern Examples

Strategy/Structure	Business Planning	Performance Measurement	Risk Management Process	Risk Management Organization	Project Risk Management*
Description of Analyser Type Determinants					
Growth-oriented objectives and stress of innovation. Prefers stability and limited adaptability. Draws on external support (e.g. auditor, tax adviser and management consultant).	Use of sophisticated formal planning systems. The various subplans are linked together. Long-term planning horizon. For the short-term planning a detailed profit and liquidity planning is implemented.	Application of modern instruments of performance measurement, for example the Balanced Scorecard, the shareholder value and use of a knowledge management system. Also intends to use these instruments for risk management purposes.	Considers all types of risk facing. Long-term risk perspective. Risk reviewing frequency at shorter time intervals. Link of risk management to business planning highly advanced.	Responsibilities of risk management implementation and development are assigned to the controlling unit and other functions. Highly sophisticated risk assessment. Combines qualitative and quantitative methods. Greater involvement of employees in risk assessment. Comprehensive contingency and replacement regulations.	Employment of classic project management tools such as network diagram and critical path method. Sophisticated project risk management tools, especially failure mode and effect analysis. Beginning to develop a single project risk consolidation.
Top Five of Analyser Type Scoring Patterns: General Risk Management (N = 219)					
21	9.6%	H	L	M	L	
12	5.5%	H	M	M	L	
5	2.3%	H	L	M	M	
5	2.3%	H	H	M	L	
3	1.4%	M	M	H	L	
46	21.0%					
Top Five of Analyser Type Scoring Patterns: Project Risk Management (N = 166)						
12	7.2%	H	L	M	L	M
11	6.6%	H	M	M	L	M
4	2.4%	H	L	M	L	H
3	1.8%	H	L	M	M	M
2	1.2%	H	L	H	M	M
32	19.3%					

L = Low, M = Moderate, H = High * if it applies

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As the present investigation has revealed, the analyser type includes medium-sized and large companies. Analysers have largely an employed managing director (so-called "other" type of management). In owner-managed businesses often another employed managing director is present. In the analyser type the managers mostly have a university-level education. The companies are all ISO-certified.

The analysers are to be found in sectors with growth and innovation potential. They have a clear business strategy which for the most part has been set out in writing. Increased use is made of external advisors for questions concerning business strategy and business management. The analysers are predominantly to be found in the engineering industry and in information technology. The companies' competitors are mainly larger companies and so they operate a niche strategy, with which they are relatively successful.

The relationship with the bank can be described as good. The companies have well-developed business planning systems. Rules covering replacement and contingencies are available.

Analysers are "by definition" already quite good at managing risks. But there still remain important issues where they could improve.

Business Planning

Analysers have the most complex business planning systems of the types being considered. They should give their special attention to a consequent co-ordination of their various subplans. Even larger SMEs often apply self-developed planning systems which are constantly extended. Here more frequent application of standard business planning software is recommended.

Performance Measurement

Concerning general management purposes, analysers already work with modern instruments of performance measurement. They do not always apply them in pure form but adapt them to the specific needs of SMEs.

An important improvement would be the consequent utilization of already established instruments of performance measurement for the purpose of risk measurement. This is particularly sensible with regard to identifying and evaluating qualitative risks.

Risk Management Process

To improve their practices in the sense of a holistic risk management, analysers reveal need for action in two directions.

In the first place the link between risk management and the business planning must further be extended.

Additionally, to monitor the firm's entire risk position a risk map or a risk portfolio should be implemented. In this respect the firms of the present study expressed their greatest need.

Risk Management Organization

The analyser has established the responsibilities for risk management company-wide in a rather satisfactory manner. The methods to identify and evaluate risks can be

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judged to be proper. The risk management should be further improved by an integration of the already existing management subsystems.

Project Risk Management

Analysers have the most advanced project risk management of all types. An important problem to solve remains the development on the company level of an overall risk portfolio. Such a portfolio has been implemented by hardly any firms, and here analysers see clear need for action for the future improvement of project risk management.

To conclude, the analyser is the only type which can sustain in a very dynamic business environment without undergoing major changes in their business management systems. The implemented risk management so far allows him to identify critical events early enough. Particular attention should be paid in developing the risk mapping/risk profile further.

The following Table 9 summarizes the distribution of the three risk management types. As explained before introducing the types of risk management practices, scoring patterns occurring only with frequency 1 have been neglected in assigning a type, leading to a type evaluation of 97.3% (general risk management) and 87.3% (project risk management).

Table 9: Frequencies of the Types of Risk Management Practices

Type of risk management practices	General risk management		Project risk management	
Reactor	102	46.6%	34	20.5%
Defender/Prospector	52	23.7%	77	46.4%
Analyser	59	26.9%	34	20.5%
Pattern not evaluated	6	2.7%	21	12.7%
Total	219	100.0%	166	100.0%

Since in Tables 6 to 8 the sums of the top 5 scoring patterns for each type and both cases of risk management cover larger shares of the sample, it is not surprising to meet in Table 9 roughly the same total percentages.

Concerning general risk management, the defender/prospector and the analyser type both make up about a quarter, while the reactor type clearly dominates with nearly the half of all patterns. On the contrary, project risk management reveals the reactor and the analyser type to have nearly the same share, with the frequency of the defender/prospector type being about twice.

Finally, the scoring means of the risk management types shall be visualized graphically. Here the mean scoring profile of a risk management type is defined as the graphical representation of the means of the scoring variables for this type. To make the values comparable, the original means were transformed linearly to the same interval of 0 to 10, by using the respective theoretical minimum (0) and the theoretical maximum (see Table 4).

The scoring profiles confirm the idea that, on the average, a defender/prospector is "better" than a reactor and that an analyser is "better" than a defender/prospector.

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Figure 2: Mean Type Profiles: General Risk Management

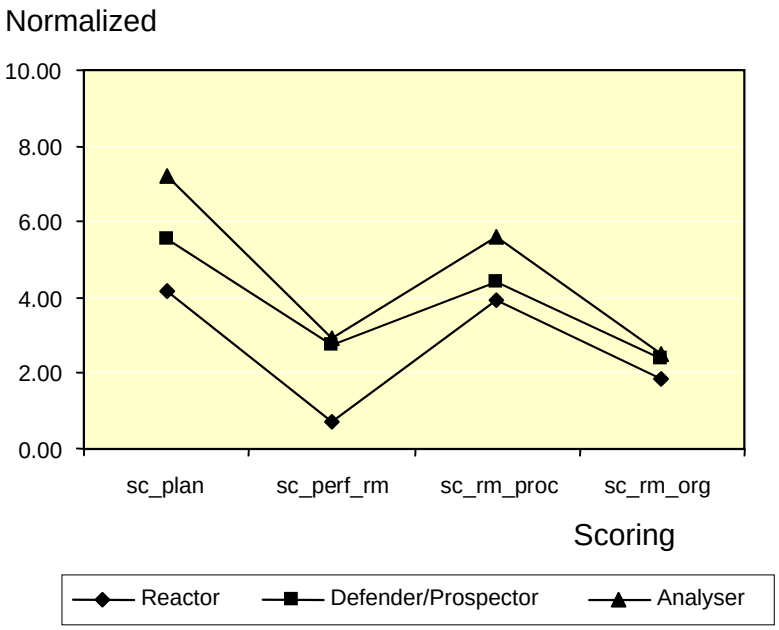
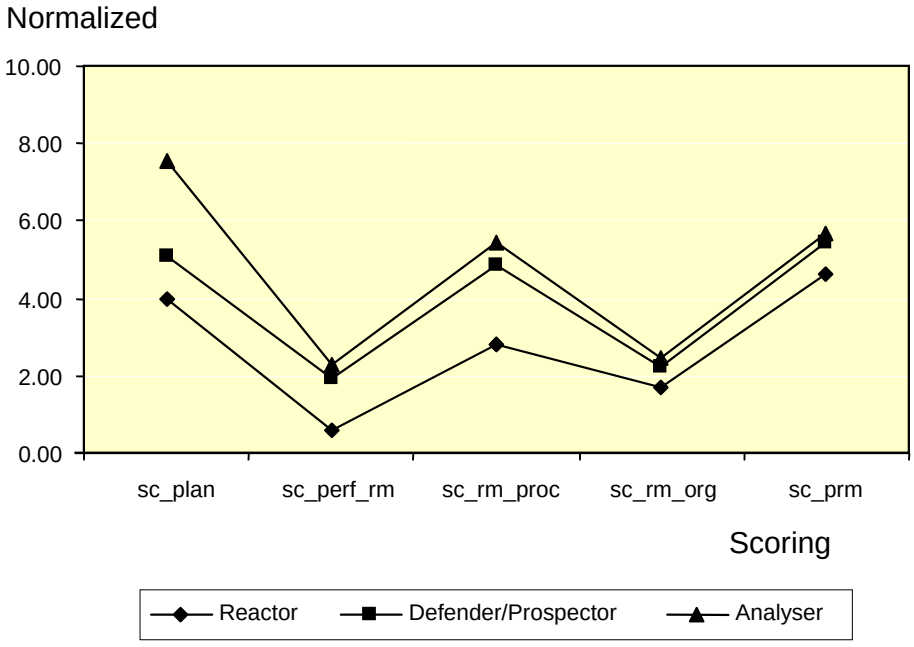


Figure 3: Mean Type Profiles: Project Risk Management



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The risk management types are derived from scoring patterns, an association which is independent from the sample being considered. In contrast to that, the average scoring profile of a type reflects the respective scoring patterns occurring to make up this type within a concrete sample. So it is not surprising to come upon some "outlier" means.

All profile graphs are a kind of zigzag line, alternately decreasing, increasing, decreasing, ... It means that for each type, on the average, the (normalized) score for performance measurement is lower that the score for business planning, the score for risk management process is again higher than that for performance measurement, and so on.

The reactor profile for general risk management is clearly below the other types, while the defender/prospector and the analyser profile nearly touch for performance measurement and risk management organization.

Again, the reactor profile is clearly the lowest. In the case of project risk management, the average profiles for defender/prospectors and analysers show still more similarity, with the largest deviation occurring for business planning.

5. Conclusion

The scoring approach has shown that German SMEs appear with very different levels of risk management sophistication. Regarding the responsibility for implementation and reviewing the risk management, the all firms have low scores. A similar picture can be stated for the risk communication and documentation. The risk management process is more differentiated. Risk assessment has already made some progress.

The most significant problem in all SME size classes is still the lacking integration of the identified risks into to the business planning. Without such an integration the firms are unable to determine the company's entire risk position.

The company size is an essential factor to distinguish the quality of risk management systems. The industrial sector has only limited power to distinguish. One can merely state that sectors with a more elaborate technology – such as engineering, information technology or auditing/consulting/training – have already made stronger efforts on risk management. In contrast to that, the sectors construction and trade/service/logistics are rather lagging.

For a risk management process being able to work it is also essential that there is a holistic integration into the existing business planning systems. Without this integration risk management would only remain mere "empty talk" and of no value for the firm. The employees would not see its benefit, they would only think of it as an additional workload. If, in contrast to that, risk management were integrated into the standard planning process, the acceptance would increase, leading to a more systematic and comprehensive risk assessment. Only in this way risk management in SMEs can be established which ensures practicability and low costs.

Management Accounting plays an essential role for organizing risk management in SMEs and for improving it. The managing director alone will not be able to establish and to maintain risk management. The results of the investigation have presented that firms having a management accounting unit assign it to implement risk management. In firms having a management accounting function the risk management process and

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the methods of risk assessment are significantly better established. There is a size effect with respect to having a management accounting unit: management accounting plays a role only for medium-sized and for larger firms. In micro and small firms management accounting tasks are carried out by the managing director or by a member of accountancy staff.

The scoring approach offered in this study is the first one that allows a comprehensive assessment of risk management practices. The inestimable advantage of a scoring approach as presented here is its transparency which allows other researchers or users an easy modification to adapt it to their specific needs.

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Dai Yun

Knowledge Exchange Mechanisms between Higher Education Institutions and the Life Science Industry

Abstract

Knowledge is considered as one of the strategic resources of a firm. As a firm may not be able to develop all the technology they need in house, knowledge exchange (KE) with other organizations has become an important way to gain access to new knowledge. The process of knowledge exchange appears to carry out in diverse ways. Different industries and different companies tend to focus on different channels to exchange knowledge and their outcomes of KE are likely to be heavily affected by different variables. This paper tries to investigate what are the most important KE channels or the most influential KE success factors in the life science industry. The results show that life science companies prefer to exchange knowledge in a formal way. Technology and people elements are the most powerful drivers and success factors of KE in this sector.

Keywords: Knowledge Exchange, Knowledge Exchange Channels, Key Success Factors.

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1. Introduction

Knowledge has become the main source of wealth, employment and economic development and a key factor of competitiveness in advanced regions and nations (Todtling et al., 2006). Promoting knowledge creation and sharing among organizations is an increasingly important challenge for managers (Kogut and Zander, 1992). The access and flow of knowledge can lead to increased efficiency (Ruggles, 1998) and be beneficial for innovation and new product development (Armbrecht et al., 2001; Hoegl and Schulze, 2005). The creation, exploitation or dissemination of knowledge is highly dependent on external knowledge sources. Universities are crucial agents in this respect, particularly for high-tech companies. Thus, various forms of university-industry partnerships play a vital role in the process of knowledge generation and innovation (Todtling et al., 2006).

Todtling et al. (2006) distinguish the types of knowledge interactions into two categories: static and dynamic. Static knowledge exchange, which is considered as

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knowledge transfer, refers to the transfer of information or knowledge from one actor to the other. Examples of this type of relations would be licenses or patents. Dynamic knowledge exchange refers to a situation, where there is interactive learning among actors through for example co-operation or joint activities. Perhaps the two most active areas of knowledge flow between universities and industries are the biotechnology/life science and electronics (Agrawal, 2001). As Powell (1998) said, "In the rapidly-developing field of biotechnology, the knowledge base is both complex and expanding and the sources of expertise are widely dispersed". It is hard for biotechnology companies to acquire all the technology they need under one roof. Thus, some biotechnology companies have turned to knowledge exchange as a route to gain access to new knowledge (Cho and Pucil, 2005). Increasingly, biotechnology companies are looking to Higher Education Institutions (HEIs) as one of the prime sources of relevant intellectual property (IP). Therefore, it is important to develop a deep understanding of the Knowledge Exchange (KE) mechanisms between Higher Education Institutions (HEIs) and industry, particularly life science/biotechnology industry.

Cambridge – MIT Institute sponsored a research programme to understand and codify the diversity of existing models of university-industry knowledge exchange (KE) operating in the Scottish biotechnology sector. Moreover, this research programme intends to identify the variables which may affect knowledge exchange. In relation to the research programme, the objectives of this paper are:

- To codify the knowledge exchange channels between HEIs and the Scottish life science industry and their relative importance

As the primary drive for the knowledge exchange is the technology required in the new product and process development (Powell, 1998), it would be helpful to know what knowledge exchange channels are most likely to be used between HEIs and the Scottish life science industry, and at each stage of the R & D process. The contribution to this area of research could have a positive impact on the new product development and thus on the innovation in the biotechnology industry as well.

- To identify the variables which may have an impact on the success or failure of knowledge exchanges and their relative importance in the Scottish life science industry

It would be helpful to investigate the key success factors of knowledge exchange and their relative importance in the context of life science / biotechnology industry.

This paper proceeds as follows. Section 2 discusses the main variables that may affect the success of knowledge exchange. Section 3 reviews the literature on the knowledge exchange channels and summarizes the research findings in this area. Section 4 explains the design of the research methodology. Section 5 analyzes the data from the interview and questionnaire survey and discusses the results and findings of the research. Section 6 discusses the possible future research areas and summarizes the results of this research study.

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2. The key success factors in knowledge exchange

Researchers have noticed that some factors would affect the effectiveness and the channel of knowledge exchange (e.g. Cohen and Levinthal, 1990; Mansfield, 1995; Cockburn and Henderson, 1998; Khamseh and Jolly, 2008). These factors can be grouped into the following categories: the nature and characteristics of transferred knowledge; the absorptive capacity of partners; the strategies, policies and culture of partners; the relational characteristics of partners; and the geographic location of partners.

Nature of knowledge

Winter (1987) proposes four dimensions of knowledge: tacit versus explicit, teachable versus unteachable, complexity versus simplicity, observable versus unobservable. Tacit knowledge is defined as knowledge that cannot be articulated or verbalized and that resides in an intuitive realm. Explicit knowledge is knowledge that is codified and transferred in a formal, systemic language (Polanyi, 1966). Winter (1987) points out that knowledge is more easily transferred when it is teachable, articulated, observable and simple. Tacit knowledge is subjective and derived from personal experience or company culture and shared routines. Therefore it is often learned via shared and collaborative experience (Nonaka and Takeuchi, 1995). The complexity of knowledge might affect the comprehension of an asset and impair its transferability. Also, core knowledge, which is central to a firm's success, is more difficult to transfer as a firm is more likely to limit the diffusion of valuable knowledge (Khamseh and Jolly, 2008).

Absorptive capacity of partners

Cohen and Levinthal (1990) introduced the concept of absorptive capacity which refers to a firm's ability to evaluate, assimilate and use outside knowledge for commercial ends. They argue that absorptive capacity is a function of its investment in R & D. Further research shows that the existence of prior and familiar knowledge (Inkpen, 1998), the similarity of resources bases, organizational structures and processes (Lane and Lubatkin, 1998), and the connectedness between firm and university such as research collaboration and share of research results (Cockburn and Henderson, 1998) are also important for a firm to utilize externally generated scientific knowledge. Since the knowledge exchange is primarily provoked by firms' technology need (Powell, 1998), it is hypothesized that the technology fit between university and firm could affect the outcome of a knowledge exchange. Also, the university technology transfer office will evaluate the commercial potential of university researchers' inventions before applying for a patent (Rothaermel and Thursby, 2005). This acts as a filter whereby only when high quality IP is identified it is likely that knowledge exchange will take place.

Strategies, policies and culture of partners

Thursby and Thursby (2000) indicate that professors' propensity to patent (on the supply side) and firms' propensity to outsource R & D by licensing (on the demand

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side) is the primary drive for the growth in licensing patented university inventions. It is also known that university policies such as intellectual property policies are related to the degree of production and licensing of patents (Agrawal, 2001).

Lucas (2006) studies the role of culture on knowledge exchange and argues that culture, defined by Hofstede's dimensions - power distance, individualism/collectivism, uncertainty avoidance and masculinity/femininity, will significantly affect knowledge exchange between parent and subsidiaries. For example, masculine culture focuses on competition and self-interest while feminist culture focuses on compromise and negotiation. Subsidiaries in masculine societies will only exchange knowledge if some new gain arises from doing so. In contrast, knowledge exchange between feminist subsidiaries would achieve through negotiation (Zander and Solvell, 2000). Inter-subsidiary knowledge exchange is more likely to be effective when the subsidiaries involved are located in similar cultural contexts. For example, in weak uncertainty avoidance (UA) subsidiaries, there would be a desire to experiment with new things and continue to learn. If the knowledge provider operates in a strong UA environment and the knowledge acquirer operates in a weak UA, there would be significant resistance to the knowledge exchange process (Lucas, 2006).

Relational characteristics of partners

Here the factors include quality of people, experience of technology transfer office and interpersonal relationships including trust and shared goals. Feldman et al. (2000) found that experienced university technology transfer offices are more likely to use equity in their licensing contracts which may increase the option value of technologies and improve the alignment between the university's interests and those of the firm.

Researchers have found that relationships are important for acquiring information. Zucker et al. (2000) indicate that the number of scientists who either left universities and then work in firms or have affiliation with firms would have a positive and significant effect on a firm's number of patents granted, the number of products in development and the number of products on the market. Social network theorist, Granovetter (1973), introduced the concept of tie strength to describe the closeness and interaction frequency of a relationship between two parties. Weak ties, typified as distant and infrequent interaction, can be instrumental to the diffusion of ideas and technical advice (Constant et al., 1996) and are more likely to be the sources of novel information (Granovetter, 1973). Weak ties are advantageous for the receipt of explicit knowledge because they are less costly to maintain (Hansen, 1999). On the other hand, strong ties are also important because they are more accessible and willing to be helpful (Krackhardt, 1992). Strong ties lead to greater knowledge exchange (Hansen, 1999) because trust is more likely to occur among strong ties (Glaeser et al., 2000). Trust would make people more willing to give useful knowledge (Andrews and Delahay, 2000) and make knowledge exchange less costly (Zaheer et al., 1998). Close relationships favour tacit knowledge exchange which would develop sustained competitive advantage of a firm (Cavusgil et al., 2003).

Regular contact between partners will facilitate the sharing of information (Khamseh and Jolly, 2008). The exchange of information has to be frank and accurate. Openness is a necessity for the exchange of tacit knowledge (Cavusgil et al., 2003).

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Collaborative objectives of partners are a key element in knowledge creation. In order to promote knowledge exchange, it is important for the collaborating organizations to have trust, shared goals, commitment to these goals and a corporate culture to support knowledge exchange (Coleman, 1999; Kalman, 1999; Cress et al., 2007).

Geographic location of partners

As knowledge transfer requires direct interaction among collaborators, it often remains geographically local (Agrawal, 2001). Mansfield (1995) demonstrates that knowledge flows from universities tend to be mitigated by geographic distance. Agrawal (2000) reports that geographic distance has a negative effect on the commercial success of the licensed invention as geographic distance increases the transport costs. Rothaermel and Thursby's (2005) research seems to indicate some benefits of being closely located to the sponsoring university on firm performance. Audretsch and Feldman (1996) found that innovative activity will cluster in regions where industry R & D, university research and skilled labour are prevalent. Zucker et al. (2000) found that the concentration of researchers and universities will affect the geographic distribution of biotech firms. However, with the development of the internet, email has become one of the main knowledge exchange channels in the construction industry (Lin et al., 2006). The influence of geographic location on the knowledge exchange channels might reduce. Todtling et al. (2006) found that high-tech firms rely more on international knowledge sources than on regional ones.

3. Knowledge Exchange Channels

Based on literature review, the process of knowledge exchange and the subsequent application is carried out in a number of complex and diverse ways (Powell, 1998; Koka and Prescott, 2002). By and large, these methods fall into two categories (Powell, 1998) - strong ties (formal networks and collaborations, joint ventures, strategic alliances and R & D partnerships) and weak ties (informal networks and scientific meetings).

The common channels used in the manufacturing industry to exchange knowledge between universities and firms include (e.g. Cohen et al., 1998; 2000; Powell, 1998; Oliver, 2004; Cress et al., 2007; Hoegl and Schulze, 2005; Rothaermel and Thursby, 2005; Salman and Saives, 2005; Lin et al., 2006):

Strong ties: patents, licences, joint ventures, research contracts, formal networks

Weak ties: consulting, academic publications, scientific meetings, informal personal networks, research grants, recruitment of students, email, shared databases, experience workshops and communities of practice

However, these channels are not of the same importance. Cohen et al. (1998; 2000) state that publications, public meetings and conferences, informal and personal information and consulting contracts appear to be the four most important ones. Also, the relative importance of the channels may vary across the industries. Todtling et al. (2006) found that high-tech firms rely more on consulting, research contract, R & D co-operations and the joint use of R & D facilities. Networks are more important for this type of firms. Cohen et al. (1998; 2000) examine the channels of knowledge

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exchange and the relative importance of them based on a survey of 1478 U.S. R & D lab managers in the manufacturing sector. Powell (1998), Oliver (2004), Salman and Saives (2005) study the R & D collaboration in the context of the biotechnology industry while Lin et al.'s (2006) research is based on the construction industry. Different industries yield different results. Therefore, it would be helpful to explore not only what channels the Scottish life science companies use to exchange knowledge but also the relative importance of those channels.

The creation and exchange of knowledge has a significant impact on the new product development (Mansfield, 1995; Powell, 1998; Hoegl and Schulze, 2005). The pharmaceuticals and the biotechnology industry are responsible for about 40 percent of all Britain's corporate R & D spending (Cookson, 2004). However, there is a lack of research on the influence of new product development / R & D activities on the knowledge exchange channels used. There are different classifications of the stages of new product development or R & D process. Based on the definitions of Chandrasekar et al. (1999), Alam and Perry (2002) and Alam (2003), this paper will adopt the following classification for general new product development process / R & D process (Diagram 1): idea generation, idea screening, target identification, product design, product testing and commercialization. For the drug development process specifically, the stages of R & D process could be identified as (Diagram 2): idea generation, screening, target identification, chemical lead, preclinical testing and clinical testing (Alshawi et al., 2003). Here target identification means the study on the effectiveness of the potential drug candidates against the specific disease while chemical lead means the mapping of the compound's structure. Agrawal and Henderson (2000) indicate that different firms tend to use quite different channels to access university knowledge. Similarly, Colyvas et al. (2000) report that at different stages of business firms might use different knowledge channels. For example, at the early stage of business, firms tend to use more direct interactions. Therefore, it is assumed that the knowledge exchange channels used will vary with the stages of new product development / R & D process and with firms.

Diagram 1: New Product Development Process/R & D process

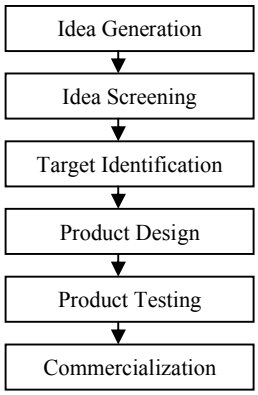

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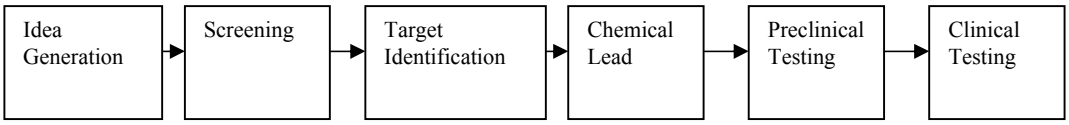
Diagram 2: New drug development process/R & D process



4. Research Methodology

Semi-structured interview and questionnaire survey were used for this research study. Both the interview and the questionnaire survey included 26 questions under the subheadings of characteristics of the company, drivers of KE and choice of collaborator, the KE process, outcomes and critical success factors. Interview questions were designed first for the interview survey and then adjusted to a format which is suitable for the questionnaire survey. These questions were developed from literature review to ensure that they do not miss any important points. The companies were also provided tables to indicate the drivers of KE/ Choice of KE partners and the relative importance of the variables, the KE methods used at each stage of the R & D process, the relative importance of the KE methods and the key success factors of KE and their relative importance. The drivers of KE, KE methods and key success factors included in the tables contain the most common variables that can be identified from literature. The companies were free to add other variables into the tables. The companies were asked about the relative importance of the variables from 1 not important at all to 5 very important. The mean is the average importance by all the respondents. Two definitions of R & D process were provided in the surveys, one was for the drug development companies specifically which was adapted from Alshawi et al.'s (2003) classification, and the other was more general and adapted from Chandrasekar et al.'s (1999), Alam and Perry's (2002) and Alam's (2003) classification. These two definitions have been explained in Section 2 of this paper. Based on the characteristics of their company, the companies were free to choose or revise either of the definitions, or to add a new definition.

105 Scottish life science companies listed in *Life Science Scotland Source Book 2004/05* (Scottish Enterprise, 2004) were contacted between May 2006 and March 2007. Three companies agreed to offer an interview. These included one drug development, one drug manufacture and one drug testing company. Another 17 companies completed the questionnaire. Excluding 15 companies who have changed their address, closed down or have no KE activities, the response rate is 22%.

5. Analyses and Findings

Drivers of KE/Choice of KE partners

All the companies surveyed indicated that the primary driver of knowledge exchanges is technology need. The expertise and the interest level of the collaborator are the two most important factors that companies will consider when selecting a KE partner, followed by the personality of people involved. By contrast, geographical distance

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and organizational culture are not likely to be important in the choice of KE collaborators. The results are shown in Table 1.

Table 1: Drivers of the KE/Choice of KE Partners

	Mean	Ranking
Technology need	4.68	1
Personal expertise	4.22	2
Interest level of partners	3.50	3
Personality of people involved	3.18	4
Availability of funding	3.17	5
Market competition	2.83	6
Organizational culture	2.28	7
Geographical distance	1.94	8

The KE Channels

A number of KE channels are used by all the companies surveyed to exchange knowledge, which include: personal exchange, consulting/expert advice, joint ventures, material transfer agreements, scientific meetings, licensing, research contracts, publications, patents, informal meetings, studentship, confidentiality agreement, service contract and copy right. Among these KE channels, material transfer agreements, confidentiality agreement, service contract and copy right are rarely mentioned by previous literature. Moreover, some of these KE channels are more important than the others and their relative importance varies with firms. For example, patents are most important (of importance 5) for one company but not important at all (1) for another; personal exchange is not important at all (1) for one company while most important (5) for another. Despite of the discrepancy in the relative importance of KE channels between firms, confidentiality agreement, patents, consulting, licensing, personal exchange, research contracts and joint ventures could be the most important ones based on the mean of the variables. By contrast, studentship, service contract, scientific meetings and copy right are not likely to be important KE channels. Confidentiality is a big issue in the life science company as competitors can easily imitate the invention by slightly changing the formula. This could be one reason that confidentiality agreement is on the top of the KE channels used. Surprisingly, meetings and conference and publication which could be the favourite KE channels in other industries (e.g. Cohen et al., 1998; 2000) are not that important in the eyes of Scottish life science companies. The need for confidentiality may be the reason why Scottish life science companies tend to use formal means to exchange knowledge although personal relationship is important for their R & D activities and knowledge creation. The results of the interview and questionnaire survey are shown in Table 2.

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Table 2: The KE Channels

	Mean	Ranking
Confidentiality agreement	4.68	1
Patents	4.35	2
Consulting	4.05	3
Licensing	3.82	4
Personal exchange	3.70	5
Research contracts	3.39	6
Joint ventures	3.32	7
Material transfer agreements	3.28	8
Publication	3.21	9
Copy right	2.78	10
Scientific meeting	2.79	11
Service contract	2.74	12
Studentship	2.17	13

When asked about the new product development / R & D process, 6 drug development companies chose the specific definition for them while 14 companies chose the general definition provided. Only one drug manufacturing company changed the provided definition slightly to fit their specific business activities by combing the idea screening and target identification stages with the 'identifying source of raw materials/know-how' stage. The findings of the KE channels used at different stages of the R & D process can be summarized as follows:

- In different stages of new product development / R & D process, the knowledge exchange channels used in a firm are likely to be different.

  For example, in a drug development company studentship is used in the idea generation, screening, target identification and chemical lead stages while consulting/expert advice is only used in the clinical testing stage. Research contract is used in the target identification, chemical lead, preclinical and clinical testing stages while scientific meeting is used in the idea generation, preclinical and clinical stages. A drug manufacture company uses research contract and scientific meetings in the idea generation stage but not in other stages. By contrast, this company only uses studentship, material transfer agreements and service contract in the identifying sources of raw materials/know-how stage. The most popular KE channels used at different stages of R & D are summarized in Table 3.

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- When there are knowledge exchange activities, life science companies are likely to use more than one channel to exchange knowledge at a certain stage of R & D process.

  For example, at the idea generation stage one company uses publication, studentship and scientific meetings to exchange knowledge and another company uses consulting/expert advice, research contracts, personal exchange, confidentiality agreement and scientific meetings. In the second stage of R & D process, publication and studentship are used by one company and consulting/expert advice, personal exchange, confidentiality agreement, studentship, material transfer agreements and service contract are used by another company. These examples also show that:

- In a certain stage of new product development / R & D process, different firms tend to use different knowledge exchange channels.

Table 3: Popular KE Channels Used in the R & D Process

General R & D process	Popular KE channels	Drug development process	Popular KE channels
Idea generation	Confidentiality agreement, personal exchange, consulting, scientific meetings	**Idea generation**	Research contract
Idea screening	Consulting, confidentiality agreement, personal exchange, research contract	**Screening**	Joint venture
Target identification	Confidentiality agreement, consulting, research contract	**Target identification**	Publication, research contract, studentship
Product design	Confidentiality agreement, consulting, personal exchange, licensing	**Chemical lead**	Publication, patents, licensing, joint ventures, research contract
Product testing	Confidentiality agreement, consulting, , personal exchange, research contract, service contract	**Pre-clinical testing**	Research contract, scientific meetings
Commercialization	Publication, licensing, patents	**Clinical testing**	Consulting, scientific meetings

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The Key Success Factors

The results of the interview and questionnaire survey are shown in Table 4. The mean is the average importance of the variables.

Based on the ranking of the relative importance, communication/openness, technology fit, commitment of partners and quality of people involved are viewed as the most influential factors in a successful knowledge exchange, followed by quality of IP and interpersonal relationships. Reputation of partners could be of significant importance in some cases. One drug manufacturing company added that the efficiency of university technology transfer department is very important (of importance 4) in terms of the influence on the KE outcomes.

The results also show that the relative importance of KE success factors vary with firms. For example, availability of funding is most important (of importance 5) in one company while not important at all (1) in another. Efficiency of technology transfer department could affect the knowledge exchange activities significantly in one company but not in the others.

Geographical distance and organizational cultures are not likely to affect the outcomes of knowledge exchanges greatly. The majority of the KE partners which could be as high as 90% are not local. The findings are different from previous research (e.g. Mansfield, 1995; Zucker et al., 2000; Agrawal, 2000, 2001; Rothaermel and Thursby, 2005) which states that geographic location would affect the outcomes of knowledge transfer. The reasons could be that the development of technology enables people to communicate via internet, which significantly reduces the importance of location.

Table 4: The Importance of the Success Factors

	Mean	Ranking
Communication/openness	4.50	1
Technology fit and relevance	4.53	2
Commitment of partners	4.47	3
Quality of people involved	4.28	4
Quality of IP	4.28	5
Interpersonal relationships	4.05	6
Reputation of partners	3.39	7
Availability of funding	3.33	8
Organizational cultures	2.89	9
Geographical distance	1.94	10

Also, the respondents indicated that the constraints or difficulties of knowledge exchanges could be: different interests /goals of the KE partners, the efficiency of the

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university technology transfer department, different opinions of IP treatment and funding. However, the biggest constraint of KE is the different interests /goals of the KE partners.

Seven companies do not measure the performance of knowledge exchanges while the other thirteen do. In every individual project, these thirteen companies compare the actual results with their plans or targets. The assessment of KE adopts scientific criteria. The companies indicate that whether knowledge exchanges are successful or not are unlikely to affect the financial performance of the company directly. Thus, they do not use financial indicators to measure KE outcome.

6. Conclusions

Knowledge exchanges between universities and enterprises are important for the innovation in the life science / biotechnology companies as it is difficult for these companies to gain the technology they need under a single roof. Previous research shows that the knowledge exchange channels used could vary with firms, industries and different stages of business. Little was known about the knowledge exchange channels used in the Scottish life science industry and their relative importance.

Three interviews and questionnaire survey were carried out during the research study. The respondents indicate that the primary driver of KE is technology need, which supports previous research (Powell, 1998). The new information obtained from this research survey is that market competition could be another KE driver. Also, personal expertise, interest level of partners and the personality of people involved are the main variables considered in the choice of KE partners.

A number of KE channels are used by the life science companies which include: personal exchange, consulting/expert advice, joint ventures, material transfer agreements, scientific meetings, licensing, research contracts, publications, patents, informal meetings, studentship, confidentiality agreement, service contract and copy right. These channels are not mutually exclusive to each other and often several of them are used at the same time. Based on literature review (e.g. Cohen et al., 1998; 2000; Cress et al., 2007; Hoegl and Schulze, 2005; Rothaermel and Thursby, 2005; Lin et al., 2006), material transfer agreements and confidentiality agreement could be specific to the life science / biotechnology industry as they are not common in other industries. Moreover, these KE channels are not of the same importance and their relative importance varies with firms. Cohen et al.'s (1998; 2000) research shows that meetings and conference and publication are of most significance. This research study has different results. As a general rule, confidentiality agreement, patents, consulting, licensing, personal exchange, research contracts and joint ventures could be the most important KE channels while studentship and scientific meeting are likely to be the least important ones. The results indicate that the Scottish life science companies prefer formal means to exchange knowledge although personal relationships are important in their R & D activities and knowledge creation.

At a certain stage of new product development / R & D process, as long as there are knowledge exchange activities, life science companies are likely to use more than one channel to exchange knowledge. Moreover, at a certain stage of the R & D process,

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different firms tend to use different KE channels. Similarly, in different stages of R & D process, a firm is likely to use different KE channels.

A number of variables may have impact on the results of knowledge exchanges. This research study contributes to the body of knowledge by identifying these variables and their relative importance. The findings show that communication / openness between the partners, technology fit, commitment of partners and quality of people involved are likely to be the most influential ones, followed by quality of intellectual property (IP) and interpersonal relationships. The efficiency of university technology transfer department and reputation of partners could also be of significance in some cases. By contrast, geographical distance and organizational cultures are not likely to have great influence on the KE outcomes. The results show that a majority of the KE partners are non-local. The widely acceptance of internet could be one reason that people have changed the way they work. Life science / biotechnology companies no longer rely on the geographic location for the attainment of knowledge as previous research states (e.g. Mansfield, 1995; Zucker et al., 2000; Agrawal, 2000, 2001; Rothaermel and Thursby, 2005). Also, it is found that the biggest constraint of KE is the different interests /goals of the KE partners.

As to the measurement of the outcomes of knowledge exchanges, it is found that not all the life science companies measure their KE performance. For the companies that do make the assessment, they often compare the actual results with their plans or targets in scientific and technical terms. This means that they often use scientific indicators rather than subjective indicators or financial indicators to measure their achievements in individual projects. This might be because the knowledge exchange activities are unlikely to have a direct impact on the financial results although it is important for the innovation.

This research study has limitations. One limitation is the small sample size. Further research can extend to all the life science companies across the UK.

Another limitation is that the KE channels and the success factors contained in the research may not make a full list. They may be comprehensive. However, as the relative importance of the variables varies with firms and different circumstances, the research results of this paper can only provide a general picture.

One area of future research could be the development of a route map of successful knowledge exchanges. Although some information has been obtained on the use of KE channels and KE success factors, a route map needs to be developed which combines the steps of knowledge exchange and all the relevant factors that have been discussed in this paper in each step.

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Financial Liberalization in Developing Economies: Theory and Evidence

Abstract

The lack of provision of long-term credit constraining output and growth in developing countries constituted a serious market failure in many developing economies in the post second world war period. Government intervention in the credit market was considered as fully justified on account of its impact on growth and also on income distribution in so much as it allowed credit to reach individuals short of collateral and earning below-average income. Information imperfections in credit markets also created problems that could be moderated only by government intervention. Directed credit programmes with interest rate ceilings were adopted by the newly independent developing countries in the 1950s and 1960s in view of providing a subsidy to firms undertaking projects in the priority sectors as per government economic strategy. Governments also imposed controls on international capital flows, especially to restrict outflows. Such restriction coupled with an excessively overvalued currency fitted well the import substitution strategy by making technology available at artificially lower cost. However, while the Keynesian approach was proposed to solve the market failures, its implementation (or misimplementation) often led to widespread government obstructionism in the form of apparent inefficiencies in the financial system and poor economic performance. The prevailing economic conditions of the 1960's and 1970s then constituted a fertile ground for an increasing belief in free market forces and its ability to allocate resources in a more efficient manner. In this context, McKinnon, (1973) and Shaw, (1973) independently made a case for financial liberalization based on the argument that artificially low interest rates inhibits growth in developing economies. This paper brings together many of the theoretical arguments, as well as some empirical evidence, and concludes that financial liberalization has yet to find a sound, empirically verifiable underlying theoretical basis.

Keywords: Financial Liberalization, Developing Economies, Capital Flows, Capital Controls.

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1. Introduction

In this paper, it is proposed to examine the interaction between finance and the real economy in developing and emerging countries. The changes relating to financial liberalization are being examined from a historical perspective but at the same time, different views are critically discussed. Certain reservations are expressed about the New Classical approach which is the current dominating view influencing the policies of the major international financial institutions.

Every country's financial system consists of the various financial institutions and their corresponding arrangements. In an Arrow-Debreu world, markets are complete and frictionless with symmetric information and no transaction cost (Arrow & Debreu, 1954). In such a perfect environment, there is no role for financial intermediaries since surplus units[1] and deficit units[2] can easily achieve risk allocation on their own. Funding is provided through two types of market contracts, equity and bonds and economic decisions are independent of financial structures, (Modigliani and Miller, 1958). However in the real world, financial markets provide various channels for the transfer of funds from surplus units to deficit parties. Direct financing takes place when surplus units transfer funds to deficit units in exchange for primary securities. Additionally, and more importantly, financial intermediaries provide indirect financing by acquiring surplus funds from surplus units in exchange for indirect security and transferring funds to deficit units in exchange for primary securities. Empirical studies show that in most countries, a small proportion of firms' capital structure is financed by equity and bonds (Mayer, 1990). Financial intermediaries then have a major influence on the economy as they carry out two basic functions, namely:

(i) Providing an efficient mechanism for making payments, and

(ii) Facilitating the flow of funds in the economy by making it feasible for certain classes of borrowers to obtain greater quantities of credit and better credit terms than they would otherwise get from direct issuing of securities to lenders, (Gertler, M.1988).

These functions of the financial system contribute to economic growth in various ways:

(a) They facilitate trade and hence specialization, both resulting in economies of scale and welfare gains.

(b) They favour increases in aggregate expenditure and hence a higher level of economic activity.

The financial intermediation process involves the institutions in creating liquidity to the lender[3] as well as in maturity transformation by aggregating small amounts of funds and lending large parcels. Liquidity risk is thus reduced, Diamond and Dybvig (1983). Diamond, (1984) further explains that deposit-taking institutions also provide risk pooling and monitoring services[4] and hence idiosyncratic risk is reduced. Regarding the delegated monitoring function, Townsend, R.M. (1978), Gale and Hellwig, (1985) and Williamson, S.D (1986) point out that transfer of this function from individuals to specialized institutions can reduce cost as the latter benefit from economies of scale. This allows borrowers to get funds at

[1] Economic units whose savings exceed their planned investment.
[2] Economic units whose savings are not enough to satisfy their desired investment.
[3] Liquid securities - deposits.
[4] Monitoring of borrowers by lenders.

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lower cost than via direct lending. Additional resources can then be freed for productive use. Financial intermediation then results in a more efficient allocation of resources.

The debate concerning the link between financial intermediation and growth was initiated long before the arguments about financial liberalization emerged. Hamilton[5], (1791) pointed out that banks were the "happiest engine" that ever were invented for creating economic growth. With government encouragement the number of banks in the U.S.A rapidly rose from three in 1791 to above 800 in half of a century. However, Hamilton does not provide any academic rationale in support of his ideas. Bagehot (1873) and Schumpeter, (1912) underscore the causal role of intermediaries on spurring growth. Bagehot highlights the role of banks in providing liquidity to firms and the need for the former to get access to a public sector provider of liquidity, the central bank. Schumpeter on his part focused on the contribution of financial institutions in both evaluating and financing entrepreneurs in the initiation of innovative activity as well as in bringing new products and new processes to the market. The crux of his argument is that while technological innovation is a major determinant of long-run economic growth, it actually depends on the ability of the financial sector to extend credit and to provide other services[6] to the entrepreneur. It was very much later those historical economists like Cameron (1967) and Sylla (1969) examined the historical experiences of England[7] and the U.S.A[8] just before and during industrialization and gave empirical content to the idea of a link between financial development and growth.

Friedman and Schwartz, (1963) examined the cash nexus in early bank crises in the U.S.A. During the 1907 crisis banks mutually agreed not to convert deposits to currency for a while to avoid a crash. Restrictions on conversion from deposits to currency were to become unnecessary with the establishment of the central bank as a lender of last resort. However, Friedman and Schwartz observe that after the stock market crash in 1929 the US Federal Reserve Bank was passive[9] and failed to provide sufficient liquidity. The weak expansionary or tight monetary policy after the stock market crash in 1929 could not offset the movement towards a reduction of credit and money supply and made the depression deep and long.

The collapse of the financial system and of the real economy at the time of the Great Depression led Fisher (1933) to argue that the economic downturn of the Great Depression resulted from poorly performing financial markets. The prosperity period preceding 1929 was characterized by high leverage. Fisher argues that debts were great enough to not only 'rock the boat' but to start it capsizing and so the triggered downturn inevitably precipitated a series of bankruptcies, which in turn reinforced the downturn itself. While accepting Friedman and Schwartz' analysis about sharp reductions in money supply causing a fall in output, Bernanke (1983) argues that the non-neutrality of money over such a long period had no theoretical foundation. He therefore investigated the role of finance in a depression and argued that during the early 1930s, the collapse of the banking sector following large loan losses choked off financial flows to the real economy. As banks substantially withdrew from their credit intermediary role, both consumer and investor demand were reduced and this was a more

[5] Hamilton was the person to act as "Secretary of the Treasury" in the USA and he made important recommendations to government to promote the manufacturing sector. The development of banks was part of his recommendations.
[6] Evaluating projects, managing risks and monitoring managers.
[7] England 1730-1844
[8] USA 1863-1913
[9] Because it lost the leadership of B. Strong who passed away.

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important factor influencing the depth and persistence of the depression than monetary forces. Bernanke's approach revives the Keynesian tradition but enriches it with the role of the financial system. Financial considerations played an important part in the theory of investment behaviour as per Keynes' general theory (Keynes, J.M.1936). Keynes viewed the collapse of either borrowers or lenders as being sufficient to induce a downturn and that a return to prosperity required both borrowers and lenders to be confident. However, the financial system as such did not play a key role in Keynes' theory of output determination.

In a financial accelerator model, Bernanke and Gertler (1989) explain the interaction between macroeconomics and finance. They argue that with decline in net worth following deflation, collateral value falls and that such a weakening of the balance sheet forces borrowers to cut back on current expenditure and future commitments. Banks on their part are faced with a riskier position as collateral are eroded with deflation. They therefore shift to government bonds and other safe liquid assets. These two factors combined to amplify a downturn and have an adverse impact on output and employment.

2. Pre-Liberalization Period: Low-Interest Policy

In his analysis of the Great Depression, Keynes (1936) argues that investment is determined by business confidence, animal spirit and expected demand. Although interest rate matters to him, the demand factors are more important. According to the Keynesian theory of money (Keynes, 1936), after the interest rate has fallen to a certain level, almost every economic unit wishes to hold money rather than financial assets because they expect the next move to be a rise in interest rates leading to a capital loss for bond holders. Speculative gains will arise only from holdings of cash. This liquidity preference to holding productive capital causes an insufficient level of investment. The liquidity trap creates a floor to interest rates preventing the latter from falling still to a lower level until a full employment level of investment is reached. Keynesians have built on Keynes' theoretical framework to propose a standard policy of low interest rate to favour economic growth. Tobin, (1965, 1967) provides a justification for what is to-day called financial repression policies by extending the Solow Growth model[10] (Solow 1965) so as to include money and the effect of monetary policy on growth. In this model of a two-asset portfolio choice, economic units allocate their wealth between real money balances and productive (physical) capital. The higher the return on capital relative to the yield on money, the greater is the amount of capital that will be in every individual's portfolio. So, capital deepening[11] leads to higher economic growth since a higher capital-labour ratio creates greater income per capita. Capital deepening can be obtained by reducing the deposit rates of interest thereby encouraging asset holders to prefer physical capital to money.

Tobin's central thesis is that in a non-monetary economy all savings are held in the form of physical capital. Tobin then introduces money in the economy as government fiat only. This new asset has the effect of reducing the level of physical capital since some savings will be held as real money balances for precautionary and speculative demand. Precautionary balances are still more important in developing countries where income and output are more vulnerable to shocks. In order to neutralize the resulting contractionary effect, government has to provide new money to satisfy the precautionary and transaction demand. This is done by government continuously running a deficit financed by the issue of new money. The resulting

[10] Robert Solow (1965) neoclassical growth model
[11] A process of accumulating capital at a faster rate than at which labour grows.

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increase in money supply lowers the rate of return on real balances and leads to capital deepening, albeit provoking inflationary pressures. Tobin's model largely dominated the economic debate in the 1960's and 70's on account of two largely accepted views, namely: -

(i) Fiscal expansion stimulates investment and hence favours growth.

(ii) For investment to occur the return on money must be rendered lower than the marginal productivity of capital.

However, today notes and coins in circulation forms only a small part of the money supply[12]. The model is therefore limited in the sense that it considers only government fiat money and ignores inside money created through credit via the fractional reserve banking principle[13].

Keynes's liquidity trap argument as well as Tobin's two-asset portfolio allocation model constituted the rationale for an inflation tax, low interest rate policy and high banking reserves requirement throughout the world for several decades so as to prevent the allocation of savings to unproductive money balances. Additionally, just after the widespread bank failures in the early 1930's, many commentators argued that without interest rate ceilings, banks would engage in ruinous competition for funds by bidding up deposit rates and then try to cover the increased cost by acquiring risky assets for higher potential returns.

Levahri and Patinkin (1968) launched the first attacks on the Keynes-Tobin model that they consider to disregard money. These scholars argue that in a monetized economy output depends not only on physical capital but also on working capital and so money is actually a productive function of output.

However the Keynes-Tobin model remained the mainstream and during the 1960's and early 1970's, market failure/imperfection and infant industry arguments provided additional support to the policy of imposing artificially low interest rates. On these two fronts government intervention was seen as a powerful answer and the newly independent countries adopted interventionist policies.

(i) Market imperfection/failure: Stern (1991) developed a taxonomy of reasons[14] for market failures in developing countries. As for the financial sector, in the early post independence era, it was largely dominated by commercial banks and there was very little presence of non-bank financial institutions. The banks themselves were in most cases foreign-owned, with branches in the main towns only, and they supplied only short-term commercial and trade credit. They provided long-term credit almost exclusively to foreign-owned natural resources industries and failed to support the modernization of agriculture and industrialization. Further, because of the oligopolistic structure of the banking industry, the market determined rates tended to be rather high. Markets were also deficient in the provision of information and access to credit by local enterprises. This favoured the existence of an indigenous money market[15] providing basically short-term loans to farmers and small businesses. Wai (1977) also observes that while in the 1950s the unorganized money markets in most developing countries were larger than the organized ones this pattern had changed in the 1970s. Wai reports that 55-60% of demand for non-institutional credit was for purely

[12] Currency form 6 % of broad money in Mauritius.
[13] The fact that banks keep only a fraction of their asset in liquid form allows a process of deposit expansion with a credit multiplier.
[14] e.g. externalities, monopolistic/oligopolistic competition, increasing returns to scale, acute informational problems , concern about improving
[15] Made up of money lenders, traders, pawnbrokers.

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productive purposes. High interest rates were charged because of high rates of default, difficulties in enforcing contracts and the high cost of screening borrowers. Intervention in favour of low interest rates was thus considered as fully justified.

The lack of provision of long-term credit constraining output and growth in developing countries constituted another market failure and motivated a role for government. Government intervention in the credit market was considered as fully justified on account of its impact on growth and also on income distribution in so much as it allowed credit to reach individuals short of collateral and earning below-average income. Information imperfections in credit markets also created problems that could be moderated only by government intervention.

Cho and Khatkhate, (1989) suggest that still another rationale for a low interest rate policy was the severe limits to fiscal expansion in many countries because of a narrow tax base, low limits on income tax due to low real wages, inefficiency and high cost of tax collection in these countries. This argument is indirectly associated with the market failure one in the sense that tax revenue allows government to play its allocative role as regards public goods and merit goods as well as its redistributive role with respect to income inequality. These constraints on fiscal expansion were seen as almost binding and therefore the policy of low interest rates was designed to provide an environment in which access to cheap finance was possible for both individuals and government. This policy was considered as especially important where Government deficits were primarily being financed by financial institutions that play a key role in supplying finance by having to compulsorily buy government debt at a predetermined rate.

(ii) Infant Industry: Hamilton (1791), in his report on manufactures[16] in the U.S.A, suggested high tariff walls to encourage the production of textiles, ferrous metals and other industries that were less competitive than Britain. In line with the prevailing import substitution strategy it was widely accepted that some production activities could not initially face foreign competition but could subsequently develop a competitive advantage, if only they could get started and be given the necessary breathing space. The U.S.A actually adopted extensive import barriers in its first 100 years to shelter its manufacturing sector from world competition. The infant industry argument was adopted equally by Germany against British competition in the 19th century and by Japan in the automobile industry just after World War II[17]. Various writers, including Prebish (1950) and Myrdal (1960) contributed to the flourishing of the infant industry argument amongst the developing countries' political leaders in the aftermath of independence after World War II. These authors claimed that developing countries face two problems, (1) as exporters of primary commodities they are exposed to world swings in commodity prices (2) the primary sector cannot absorb the abundant supply of labour available in developing countries and rather than waiting passively for comparative advantage to direct resources to labour intensive manufacturing, industrialization should be forced by import substitution industrialization. Apart from tariff protection the infant industry argument also pushed towards government intervention in the allocation of credit with a view to boost economic development. Directed credit programmes with interest rate ceilings were adopted by the newly independent developing countries in the 1950s and 1960s in view of providing a subsidy to firms undertaking projects in the priority sectors as per government economic strategy. Such projects may have been unprofitable at the market interest rate and

[16] Just after the civil war in USA.
[17] Before Japan became a tough competitor.

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would have been excluded from the process of allocation of resources. Governments also imposed controls on international capital flows, especially to restrict outflows. Such restriction coupled with an excessively overvalued currency fitted well the import substitution strategy by making technology available at artificially lower cost. Unfortunately, an overvalued currency has its anti-exports bias and renders domestic agricultural and manufacturing products uncompetitive in world markets. Governments then had to resort to import controls to correct balance of payments difficulties.

After Keynes much of the economic debate was over the transmission mechanism linking money to real activity. Early Keynesians emphasized the role of real factors such as multiplier/accelerator effects and fiscal policy while monetarists put emphasis on the key role of money and its direct transmission to the real economy. Both the followers of Keynes and the monetarists have for long ignored other aspects of the financial system and the debate about the finance-growth nexus had been minimal.

Gurley and Shaw (1955, 1967) tried to shift the debate back towards the interaction between financial structure and the real economy highlighting the role of financial intermediaries in transmitting loanable funds between spending units. The argument put forward by Gurley and Shaw is as follows:

> Economic development is retarded if only self-finance[18] and direct finance[19] are accessible……but total debt, including both the debt that intermediaries buy and the indirect debt of their own that they issue, rises at a faster pace relative to income and wealth than when finance is either direct or arranged internally (1955, p.518)

Gurley and Shaw also argued that as the intermediary system evolves, the exclusive focus on money becomes less justified for two reasons, namely:

(i) The money stock becomes a less exact measure of the flow of credit.

(ii) The liability of non-bank financial intermediaries (NBFIs) provides an alternative form of holding liquid balances. But NBFIs whose developments in recent decades have diversified indirect finance are actually ignored in the Keynesian liquidity preference model.

With the development of NBFIs in sophisticated economies and their increasing role in lending, monetary policy becomes a less efficient measure of controlling flows of loanable funds and spending on goods and services. It actually exerts control on money, which is only one of the financial assets while it has become more appropriate to adopt financial control that regulates the creation of all assets. Referring to the Quantity Theory of Money, Gurley and Shaw observe that if other indirect financial assets exist increasingly as a substitute for money (narrowly defined), the latter asset represents a smaller share of the total financial assets and money supply may fall while interest rates decline simultaneously. This does not imply that monetary policy is of no influence on real activity. However, more important is the economy's overall financial capacity. This is the measure of the borrower's ability to absorb debt and is an important determinant of aggregate demand. In that perspective, intermediaries have an important role as they expand borrowers' financial capacity.

Gerschenkron (1962) observed from the German industrialization experience that banks played a management role in industry and also prevented fratricide struggle among industries. He further observed the role of institutions like the "Credit Mobilier" for the industrialization

[18] Investment out of retained corporate earnings.
[19] Deficit units issue direct securities to surplus units in exchange of funds. There is no intermediation.

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of France and the "abortive upswing the Italian industrial development in the 1880s mainly because the modern investment bank had not yet existed in Italy". (Gerschenkron, 1962, p.363).

Gerschenkron therefore argued in favour of "universal banking" style of Germany[20] highlighting that in economically backward countries, the setting up of banks constitutes the main source for finance and consequently for entrepreneurship. Based on evidence from Russia where public mistrust of banks kept small saver's funds outside the banking sector Gerschenkron also suggests that state ownership of banks could deepen financial markets.

Goldsmith, (1969) suggests that the financial superstructure of an economy accelerates economic growth and improves economic performance to the extent that it facilitates the migration of funds to the best user, i.e. the place in the economic system where the funds will yield the highest social return. Goldsmith developed a Financial Intermediation Ratio (FIR) of financial assets to national wealth and observed that the FIR tends to increase with the real economy. However, this sheds no light on the direction of causation between FIR and growth. Gurley and Shaw (1955), Goldsmith (1969), all gave evidence of a positive correlation between the performance of the financial and the real sector and showed a relationship between financial deepening[21] and the growth rates of real output. In fact an important implication of the Gurley and Shaw analysis about financial development[22] is that as an economy experiences growth, the rate of growth of accumulation of financial assets will be higher than the growth rate of the real economy.

In the 1950s and 1960s, the dominant thinking remained nonetheless that of Robinson (1952), namely that the financial system responded passively to demand for various types of services as a result of economic growth i.e. enterprises lead and finance follows. "When a strong impulse to invest is fettered by lack of finance, devices are invented to release it…. And habits and institutions are developed." (Robinson 1952, p. 86)

The arguments on the financial system stimulating growth moved the debate towards whether the provision of financial facilities should be demand-following or supply-leading (Patrick (1966). Patrick identified two possible patterns in the causal relationship between financial development and economic growth.

"Demand-following" is defined as the phenomenon in which the creation and expansion of financial institutions, their financial assets and liabilities, and related financial services is in response to demand for these services by investors and savers in the growing real economy, as per Robinson's hypothesis. Real economic growth leads to development of financial markets and this increases the opportunity of acquiring liquidity for reducing risk. This in turn has a positive feedback on real growth.

Patrick observes that the demand-following argument assumes that the supply of entrepreneurship in the financial sector is very elastic with respect to the profit opportunities. However, in practice the supply of financial services in response to demand may not be as

[20] Where Investment banks channeling fund to firms are not separated from commercial banks responsible for the payment system as per the policy of dividing banks by function adopted by the USA and some other countries after the great depression.
[21] i.e. the size of the intermediary sector relative to nominal income.
[22] Monetization of the economy and increased intermediation via banks and NBFIs.

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flexible and automatic as claimed because of restrictive banking legislations[23] and market failures[24]. The resulting lack of financial services then restricts the growth process.

"Supply-leading" is where the creation of financial institutions and the supply of their financial assets, liabilities and financial services are in advance of demand for them. The idea is to create favourable expectational and psychological effects on entrepreneurs, enabling them to "think-big". The likely result is the transfer of resources from traditional sectors to modern sectors and the stimulating of entrepreneurial response in the modern sectors. Hicks (1969) argued that the industrial revolution in England in the late 18th and early 19th centuries was not due mainly to technology but to financial reforms.

The setting up of the Development Bank of Mauritius just after independence, the creation of the State Bank of Mauritius, the creation of the Stock Exchange of Mauritius can be viewed as being in conformity with a partial adoption of the "supply-leading" approach as an engine for growth.

Since the 1950s the World Bank has been a promoter of development banks in developing countries as part of its institution building strategy to alleviate some form of market failures by meeting certain credit needs not supplied by commercial banks, (Fry, 1987). Many projects generating positive externalities would otherwise be underfinanced. While in Mauritius the setting up of a development bank in a "supply-leading" strategy has been effective, development banks became insolvent in many developing countries. Expansion of credit supply does not automatically stimulate investment to trigger growth.

For "supply-leading" to be effective, there should exist an entrepreneurial culture as well as an economic background favourable to investment. "Supply-leading" then represents an opportunity to induce real growth but not a necessary pre-condition. Intermediaries set up in a context of lack of demand for available funds can lead to lending to projects of dubious quality resulting in a mountain of non-performing loans.

Further, resources having alternative uses, a supply leading approach must be able to stimulate the economy to a reasonable extent to justify its adoption. Patrick actually argues in favour of a sequential mix of the two approaches with the leading pattern in the causality changing over the course of the development.

That is "as the process of real growth occurs, the supply leading impetus gradually becomes less important, and the demand-following financial response becomes dominant" (Patrick, 1966: p. 174).

There are however some well-known scholars like Lucas (1988), Stern (1991) and Ireland (1994) who simply deny any causal relationship in whichever direction between financial deepening and economic growth.

3. The McKinnon and Shaw Paradigm (Financial Liberalization)

Government intervention in the form of credit ceilings, directed credit programmes, imposition of high reserve requirements and capital controls were common practices in the 1960s and 1970s. However, while the Keynesian approach proposed to solve the market

[23] e.g. France in the early 19th Century.
[24] Religious barriers preventing the market to respond.

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failures and imperfections, its implementation (or misimplementation) often led to widespread government obstructionism in the form of apparent inefficiencies in the financial system and poor economic performance[25]. The prevailing economic conditions of the 1960's and 1970s then constituted a fertile ground for an increasing belief in free market forces and its ability to allocate resources in a more efficient manner.

In this context, McKinnon, (1973) and Shaw, (1973) independently made a case for financial liberalization so as to improve growth in developing economies. They introduced the term "financially repressed economy" in the literature to explain unintended distortions in the domestic capital market by tax[26], interest ceilings, directed credit and exchange control. Their arguments regarding the abolition of explicit controls on price and allocation of credit still constitute the core theoretical basis for freeing the financial sector from its "regulatory shackles"

The specific arguments of McKinnon and of Shaw are now examined separately.

The McKinnon analysis is based on the assumptions that every economic unit is confined to self-finance. Deposits accumulated in advance are complementary to physical capital accumulation because entrepreneurs must initially accumulate deposits for financing their investment projects. The higher the real deposit rate of interest, the lower will be the opportunity cost of saving real balances to invest and. self-financing is improved with liberalization of interest rate.

Shaw (1973) held a debt-intermediation view and developed a model in a world of credit where financial intermediaries have a role to play. If returns to depositors are increased, the financial intermediaries get possession of larger volumes of funds for lending and this result in a higher quantity of investment. As the banking sector expands, it is possible to reap economies of scale in lending and risk diversification. Operational efficiency is increased and information cost is lowered to both savers and investors through specialization and division of labour. Consequently, the investor gets a lower cost of borrowing from the banks and the average efficiency of investment rises. According to the Shaw analysis, when economic units increase savings, aggregate demand is not reduced as such but its composition is altered from consumption to investment expenditure. The policy prescription is then is to increase demand for real money balances. Rises in deposits, in investment and in growth will follow. Therefore, holding of money balances (savings) is the engine of growth.

Shaw's debt intermediation view coincides with that of McKinnon in that at a low, below market rate, interest rate reduces savings and inhibits growth. However the McKinnon model lacks consideration for credit money and stresses the role of deposits in self-financed investment while the Shaw model lacks a mechanism specifying the working of the banking system and focuses on increased lending of banks with higher deposit rates stimulating a flow of real balances to deposits[27]. The two approaches remain however complementary since most investment projects are financed partly from own funds and partly from borrowings. Also, a reduced flow of loanable funds in financially repressed economies forces potential investors to become more dependent on self-finance. The McKinnon-Shaw framework is depicted in the

[25] Free marketers would argue that the economic deterioration was actually due to government intervention and that there was a case of government failure.

[26] i.e. the financial system being taxed implicitly and explicitly

[27] i.e. external indirect financing.

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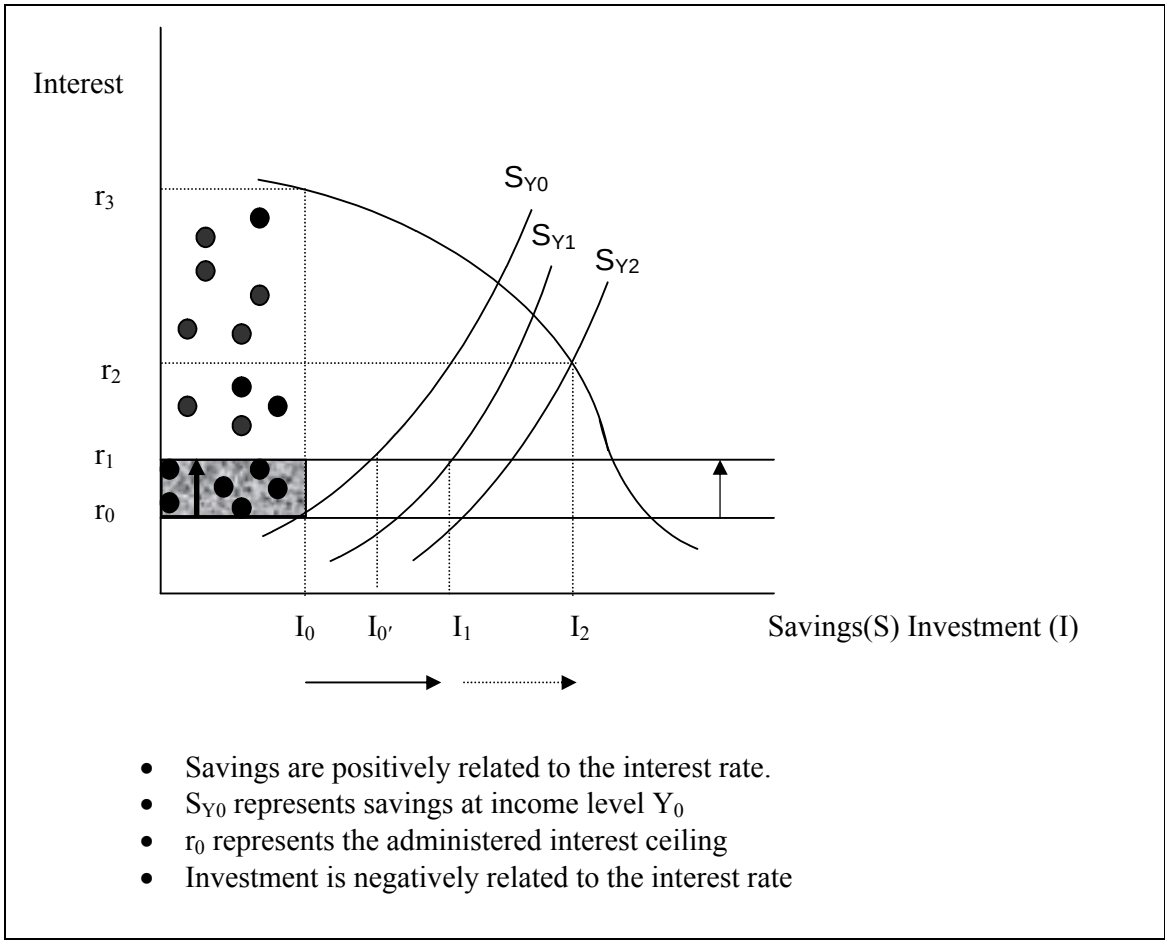
dynamic model of savings and investment developed by M. Fry, (Fry 1978) as shown in Figure 1.

At the artificially low interest rate r_o, actual investment is constrained to be at I_o because of low savings. But, if an interest ceiling applies only to deposits (Savings) and not to loans, then borrowers would face rate r_3. Fry, (1978) suggests that if the banking sector is competitive, the spread r_3-r_0 would be spent on non-price competition. However, financially repressed economies would generally apply a ceiling to both deposit and loan rates. Credit would then be rationed by non-price factors such as quality of the collateral, perceived risk of failure, political pressures, name (including nepotism), and corruption to loan officers. The investments that are financed are represented by the dots on the diagram. There is often a preference for low yielding investment that appears simplest and safe. Financial institutions are not keen to take risks since in a context of an interest ceiling there is hardly any possibility of a risk premium.

Figure 1: Saving and Investment under Interest Rate Ceilings.



- Savings are positively related to the interest rate.
- S_{Y0} represents savings at income level Y_0
- r_0 represents the administered interest ceiling
- Investment is negatively related to the interest rate

If interest is allowed to rise from r_0 to r_1, savings that previously remained outside the formal sector now become available for intermediation. As savings rise, investment rises to $I_{0'}$. Higher positive interest rates will also discourage lower yielding investment (the dots in the grey area)

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and the efficiency of investment increases. As the rate of economic growth and the income level increase, the savings curve shifts to S_{Y1} and investment level reaches I_1. If the interest rate is allowed to reach r_2, the same set of events takes place with investment ending at I_2. Higher domestic investment level also reduces excessive dependence on foreign capital flows.

The basic McKinnon and Shaw policy prescription is then to allow the market to determine the price and the allocation of credit. This would increase the attractiveness of holding claims on the banking system. The improved saving rate will then increase funds available for investment. Further, with real interest adjusting to equilibrium, projects with lower returns on investment would be eliminated. Economic development would be enhanced by both increased investment and an increase in the average productivity of capital.

Although the McKinnon and Shaw prescription focuses on improved intermediation and self-finance, the champions of the financial liberalization paradigm also expect direct financing to equally improve with the introduction of new capital market instruments as the financial market develops. McKinnon and Shaw supported their analysis by empirical evidence from reforms made in the financial sector in Taiwan in the early 1950's and Korea in the mid-1960's. Financial repression is considered to have adverse effects on growth for the following reasons: -

(i) As explained in Fry's graphical model, low (or even negative[28]) real interest rates provoke a disincentive effect on savers and so domestic deposits reach a sub-optimal level. Both interest rate ceilings and the oligopolistic nature of the banking industry push to create a wide spread between loan and deposit rates. The absence of a developed equity market is yet another disincentive to savers. The resulting increased current consumption creates demand-pull inflationary pressures.

(ii) In a financially repressed economy, because of low or even negative real deposit rates of interest on monetary assets, the demand for money (saving, term deposits and current accounts) falls as a proportion of G.D.P. Financial deepening outside the banking system also becomes impossible when firms are illiquid and or inflation is high and volatile. Robust open markets in stocks/bonds or intermediation by trust and income companies require monetary stability.

(iii) Fry, J.M (1997) observes that the financially repressed system is actually heavily taxed with both explicit taxes and implicit taxes:

- (a) Taxes on interest income, on bank intermediary profits, on financial transactions in the form of stamp duty and V.A.T (if any) constituted the explicit taxes and contributed to widening of interest spread.

- (b) High reserve and liquidity ratios[29] constituted the implicit tax on banks[30].

These allowed for a ready demand for government securities issued at low interest rates and created scope for huge amounts of tax revenue. From a bank's perspective the reserve is a taxed asset. Banks are further taxed in the sense that in addition their non-reserve assets are made to yield below world market interest rate returns. The commercial banks acted as taxpayers and the central bank as tax collector but the tax was also being implicitly borne by the depositors earning below market interest rates. High reserve/liquidity ratios taxed to credit

[28] Especially in countries with high inflation.
[29] In 1966 required reserve ratio against sight deposits was 35% in South Korea.
[30] Sometimes referred to as a financial repression tax.

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market by weakening the credit multiplier. Implicit taxation on the banking system impacts adversely on capital formation.

(iv)Low administered interest rates also encourage banks to even lend to entrepreneurs whose projects would have been excluded if the interest rate was at market level because of the low yields of their projects. Investment then suffers in quality as banks do not ration the available funds on the basis of the marginal productivity of the investment projects. This argument was initially developed by Goldsmith (1969).

(v) Directed credit[31] at an artificially low price means easy access to credit for firms identified as being in the priority sectors as per government strategy. Such easy access finally moves the firms towards a lack of discipline in the efficient use of credit and causes misuse of resources. Some firms may also get involved in unnecessary capital intensive projects with adverse consequences on the employment level

(vi)Exchange controls restrict access to foreign assets (credit), and prevented portfolio diversification. This, together with the interest rate ceiling, reduces the ability of banks to properly match demands for borrowers and creditors.

To-day's policy of removal of restrictions to capital mobility and development of an integrated global financial market linked by computer network is consistent with the McKinnon and Shaw analysis and facilitates interest arbitrage. However, with removal of restrictions on capital flows, the monetary authority loses some control over its monetary policy since a simple decision to change the amount of money in circulation is offset by inflows/outflows of hot money. Liberalization theories also rejected state ownership of banks and revived some early arguments that public ownership leads to credit being allocated on the basis of political rather than economic considerations, Kane (1977).

4. Robustness of Initial Theories - Subsequent Refinements

There have been a multitude of studies which have attempted to empirically test a number of specific hypotheses developed in the theoretical literature.

There is some discord on the effectiveness of the financial liberalization policy that remains an empirical question. With regard to the contention that a rise in real interest rate would increase savings, Deaton (1989) refers to econometric studies of interest-elasticity of savings that show low elasticities and makes the following observation:

> 'There is no theoretical basis, whatsoever for this presumption. Changes in interest rates have both income and substitution effects, and can increase or decrease current consumption depending on the balance between the two. Higher (real) interest rate do indeed increase the incentive to postpone consumption and tend to make planned consumption profile grow more rapidly over time, but the current starting point of that profile can move either up or down. There is also an enormous body of research, mostly but not exclusively in developed economies, that has singularly failed to show any empirical relation between interest rates and the rate of saving'. (1989, 87)

Giovannini (1985) points out that in Least Developing Countries the response to higher interest rate policy is either insignificant or too small to be of any policy relevance. Turtelboom (1991) on his part observes that real deposit rates did not change significantly in several African countries after liberalization. Concerning an expected fall in interest spread,

[31] Banks are compelled to grant a certain share of their loan portfolio to specific sectors.

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Brock and Suarez (2000) observe that a high interest spread persisted in some Latin American countries after liberalization.

The World Bank in a study covering 34 countries developing countries shows that investment ratio, productivity of investment and growth is higher in countries with higher positive real interest rates (World Bank 1989). Roubini and Sala-ï-Martin (1992) also find that for a sample of 53 Latin American countries over the period 1960-1985, countries with lower real interest rates experienced lower growth rate than those with positive real interest rates. However these findings do not show evidence of causality with growth since government involvement in the financial sector other than through price of credit, macroeconomic instability and the sequencing of liberalization are also influencing factors. These are discussed in turn below

The pattern of behaviour in developing countries before and during liberalization process reveals a very active role of government in finance as follows:

(1) Part of the subsidized loans to priority sectors were often funded by government owned Development Banks[32] at a negative differential between priority loans and deposit rates and financed by a direct budgetary subsidy. Woo and Nasution (1989) highlight that in some countries like Indonesia, subsidized credits from government-owned financial institutions were easily available and could be rolled over. Firms favoured by the priority sector criteria could acquire large debts that were less expensive than issuing and servicing equity. Risk became concentrated among sectors defined by government as being the high priority ones. In Korea subsidized credit led to increasing financial leverage at the expense of development of the equity market and the main recipients of credit were firms from a core of powerful groups (chaebols) that gradually dominated the heavy and chemical industries. The high leverage situation led to a high level of non-performing loans in periods of recessions and repeated bailout of banks encouraged big businesses to rely further on debts, (Choi, 1991). A high level of non-performing loans had become a problem in many developing countries.

(2) Both high liquid reserve policy and directed credit pushed many financial operators, especially the small and medium firms, into the unofficial money market[33] where "depositors" could get higher yields. For their part, borrowers could either get some access to the credit they needed, although without subsidy, or rely on self-financing.

(3) Resources were directed in financing government deficits or flew to capital-intensive projects of parastatal bodies and not always necessarily to the most productive investment.

(4) High levels of government intervention in the financial markets rendered the banks dependent on government policy and government guaranteeing loans to priority sectors. They failed to develop the loan appraisal skills that banks normally acquire when being fully exposed to market forces and they were eventually very much fragilized by increasing levels of non-performing loans.

(5) Apart from being financed not only by cheap finance and easy sales of Treasury bills, the Public Sector Borrowing Requirements (PSBR) was often additionally financed by government having recourse to the printing press. Leite and Sundararajan, (1991) argue that such central bank's accommodative policy of government spending together with credit pressures relating to the directed credit program generated high inflationary pressures.

[32] These credit programs were usually set up with funds obtained from international donor agencies such as the World Bank.

[33] Money lenders, indigenous banks, extended family and friends, landlords, traders, pawnbrokers.

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Inflationary financing then compelled government to have a minimum level of monetary control by requesting high reserve asset ratios for banks and this inevitably reduced the availability of credit to non-priority sectors. Bailey, (1956) and Friedman, (1971) argue that inflation acts as a tax by reducing the wealth and purchasing power of currency holders and also by yielding a revenue for government through a reduction in the real value of domestic currency denominated debt.

In Tanzania, Kenya and Ghana for instance, during the early 1970s the rise in inflation was associated with a rising inflation tax and relatively stable real balances, yielding total seigniorage[34] of 0.7 percent of G.D.P in all three countries (Adam, Ndulu, and Sowa, 1996). In Mexico, revenue from financial repression represented 40% of tax revenue and 5.7% of the G.D.P during the period 1984-1987 (Giovannini and De Melo, 1993). The inflationary pressure on both prices and incomes yields a higher government reserve for a given tax base. To prevent an erosion of the tax base, the authorities imposed controls on both inflows and outflows of capital and rendered contracts in the unofficial money market unenforceable.

In terms of capital accumulation and economic growth Akyuz (2005) using World Bank data shows that only 18 developing countries exhibited growth above five percent per annum during the most frenetic period of financial liberalization while the rest saw an average growth rate of merely 1.5 percent. He also argues that the financial liberalization policies in fact severely restricted many developing country Government's in their ability to effectively deploy more appropriate monetary and fiscal policy. According to Goldstein (2005) this has in turn made these countries even more prone to the negative impacts of a deterioration in global financial conditions. Akyuz goes further and argues that "...macroeconomic instability now is not instability in product markets, but asset markets, and the main challenge for policy makers is not inflation but unemployment and financial stability." (Akyuz, 2005, p. 46).

The New Classicals identify macroeconomic instability, especially large fiscal imbalances, as an obstacle for the smooth implementation of financial liberalization reforms (Hanson and Neal, 1985). In many developing countries embarking on the reforms, the Balance of Payments (B.O.P) and fiscal deficit were far from being moneyable. The early 1980s were characterized by deteriorating terms of trade, international recessions and debt burden all putting pressure on the B.O.P of many developing countries that were ultimately forced to devalue their currencies to promote exports. However, after devaluation many firms importing inputs for producing final goods for the domestic market became unprofitable and had difficulty to repay loans. This is an additional factor causing a high level of non-performing loans and contributing to fragilizing the financial sector of developing countries before liberalization. In South East Asian countries, macroeconomic imbalances had generally been eliminated before financial reforms were initiated. This is in contrast with countries like Sri Lanka, Ghana, Zambia and other African countries where the financial liberalization process was initiated in an environment of very high inflation[35] rendering it difficult to attain positive real interest rates and was accompanied by considerable loss of government revenue. Dooley and Mathieson consider that:

> '… fiscal problems, including those emerging from loss of tax revenues must be resolved. Liberalization will not in itself improve the fiscal position of the government. In general, no liberalization scheme is likely to work if it is accompanied by increasing

[34] Net revenue received by the central bank, hence by the government by "turning to the printing press".
[35] Ghana, above 20%; Zambia, above 100% inflation.

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> inflation rates that results from reduced ability to tax financial intermediation.' (1987, p.34)

The fiscal imbalance created high and variable inflation rates in many countries (Snowden, 1987). In order that the financial reforms succeed in increasing the supply of loanable funds to investors, higher and variable nominal interest rates are required and this gives rise to adverse selection and moral hazard as explained earlier. De Grawe (1987) argues that high variable inflation rates encourage high debt accumulation in the more inflationary sectors of the economy since inflation represents a net transfer of resources from lenders to borrowers and the volume of debt increases. With a sudden adverse movement in prices, projects with large debt exposures become insolvent. This has spillover effects in the financial sector. Villanueva & Mirakhor, (1990) observe that macroeconomic instability creates uncertainty affecting the future cost of funds. This acts as a deterrent to a bank's engagement in long-term risk sharing. Clearly the stability conditions are paramount for successful financial liberalization however other authors argue that it is by no means a sufficient condition. Rather, it is the time sequencing of liberalization policies themselves that often present the greatest barrier to successful policy outcomes.

McKinnon (1993), for example, revisiting his initial thesis recognizes that the interest rate is more likely to be volatile in a liberalized system and that such volatility is likely to be greater if financial liberalization is adopted before macroeconomic stability. He further suggests that full liberalization of banks during a high and variable inflation is not warranted and that problems with prudential regulations over the banking sector loans portfolios become magnified when the central bank is trying to impose tight monetary control in order to disinflate successfully. The New Classicals stress fiscal responsibility as an important pre-condition to successful liberalization. Fiscal discipline as per this analysis implies essentially maintaining control over public expenditure. Under the influence of the World Bank and the IMF many countries have been aiming at reducing budget deficit to below 2% or 3 % of G.D.P. The idea is not only to keep inflation under check and to avoid subsequent B.O.P problems. Fiscal discipline also avoids the crowding out of private investment whether it be because of subsequent increases in taxation or rises in interest rates. The New Classicals then contend that government should get the fiscal deficit under control and establish macro economic stability before scaling down the directed credit program and adjusting the level and pattern of interest. The IMF has now developed a set of macroeconomic indicators as part of its surveillance work in order to promote financial stability.

An interesting point to note is that while initially financial liberalization was considered as one component of the IMF prescribed stabilization policies[36], the arguments about macroeconomic instability contributing to financial distress actually show that the McKinnon and Shaw paradigm (1973) of financial liberalization is condemned to failure unless stabilization has been reasonably achieved. Much later McKinnon (1986) looking at financial liberalization in retrospect suggests that macroeconomic stabilization policies must precede the deregulation of banks and other financial institutions. This raises the key issue of sequencing and, in this respect, Dooley and Mathieson (1987) argue that goods and financial markets do not adjust at the same speed. Trade liberalization will move the economy from an import-substitution orientation to an export oriented one. Both imports and exports will increase but because of

[36] Policies in favour of opening the economy so as to improve the allocation of resources increase competition and productivity so as to obtain sustainable growth.

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production lags in the process of resource transfer from import substitution to the export sector, the trade balance will initially face a deficit and depreciate the currency. If there is no capital inflow depreciation can in fact favour the export industries. However, if financial liberalization is undertaken simultaneously, large inflows of capital will offset this effect and cause exchange rate appreciation that is harmful to the economy's export competitiveness. Additionally, trade liberalization implies a fall in tariffs meaning reduced government revenue. Fiscal problems must be adequately resolved, as de-repression measures in the financial sector will equally cause loss of government revenue. The World Development Report 1989 suggested that in the absence of macroeconomic stability internal flows can magnify existing domestic instability. Trade liberalization should then precede financial liberalization.

Blejer and Sagari (1987) suggest that for reasons related to the potential destruction of the domestic banking sector, this sector should be liberalized internally before liberalizing the capital account of the B.O.P. If capital controls are removed, foreign banks do not automatically and immediately enter the domestic market. The market structure of the banking sector is far from being one of perfect competition. It is then very likely that a few large borrowers (probably the banks only) will get access to the international loan market while the majority of the borrowers are excluded from carrying out transactions at international interest rates because of costly and imperfect information (Blejer and Sagari, 1987). Because of the monopolistic nature of the domestic banking industry and the absence of arbitrage, the spread between domestic deposit and lending rates as well as between domestic and international lending rates remains high. Financial liberalization then fails to bring about financial deepening since the attractiveness of deposits is not improved. Further, different aspects of economic liberalization may work at cross-purposes. Abrupt changes in interest rates may cause rapid appreciation of exchange rates and cause disruption to the real economy.

Blejer and Sagari suggest that liberalization could begin from the internal side by eliminating entry barriers for new domestic players and encouraging competition so as to weaken the market power of banks. The immediate entry of foreign banks could have an impact on the level of competition; however this move should be delayed as domestic banks would lose substantial market share due to the superior technology and the lower costs of operation of the foreign competitors. To maintain a large and profitable domestic banking sector it is necessary to begin with liberalizing the banking system internally first so as to allow the domestic banks[37] to start adopting competitive behaviours, develop new instruments and new banking practices.

However the sequencing argument has been challenged by several authors, in particular by Arestis (2005) who, in identifying this and other 'canons' of financial liberalization argues that the often proposed benefits of financial liberalization are " … so problematic that they leave the thesis without serious theoretical or empirical foundations." (Arestis 2005, p.9).

Once the banking sector has been reformed, the second step would be to give freedom of entry to foreign banks so as to render the banking sector still more competitive and to give an impetus to arbitrage pressures and hence supply the market with cheaper credit. However this argument is also seriously questioned (see Arestis 2005).

Mehrans and Laurens (1997) suggest that to achieve a better allocation of credit, policy makers need to decide when to start the liberalization of interest rates and how fast to move. It

[37] Prior to liberalization, they operate in a protected and restricted environment.

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is premature to consider financial liberalization in countries with serious macroeconomic imbalances and lacking regulatory and supervisory frameworks or interest controls need to be re-introduced. Mehrans and Laurens propose the following sequence: first, liberalize interest rates on wholesale transactions in the inter-bank market, then liberalize lending rates and lastly deposit rates.

Wholesale transactions in the inter-bank market do not affect the public directly and so do not represent a very disruptive starting process. Sequencing liberalization of lending rates before deposit rates prevents too fierce competition that could affect the profitability of commercial banks and also gives them time to strengthen their operations and financial structure. This also gives government enough time to debate and pass solid legislation concerning collateral and bankruptcy. It is also pointed out that if liberalization of deposit rates is delayed completely until all lending rates have been fully liberalized, this could lead to some unstable deposit flows between banks. Therefore, once the lending rates have been partially liberalized, the liberalization of some deposits, especially wholesale deposits by large firms, may be started and liberalization of retail deposit rates would come last. An earlier liberalization of wholesale deposits by large firms is also useful as it facilitates the development of an inter-bank market and competition with Treasury bills or repurchase agreements. This is particularly useful if the size of the secondary market is small compared to the central bank's open market operations and requirements.

Fisher (1993) suggests that before opening to international markets, reforms in favour of competition among banks and consolidation of prudential regulation and supervision should be completed. Excessive level of non-performing loans remains a third area to be addressed by liquidation or by recapitalization before external liberalization. Otherwise, domestic interest rates will fail to converge with world interest rates. A study (Caprio, Atiyas and Hanson, 1994) covering many developing countries concludes in favour of first, managing the reform rather than adopting a laissez-faire stance and second applying gradual sequencing with particular attention paid to the initial macroeconomic stability conditions.

The implementation of the financial liberalization prescription has led to many cases of financial crash in developing and emerging countries for various reasons like sequencing, macroeconomic instability and absence of prudential regulations. Countries like Argentina, Turkey, Mexico, Russia and countries in South East Asia have faced banking cum currency crisis. The established international institutions have consistently promoted the idea that if developing countries were to liberalize their financial system and adopt the models of the advanced economies they would no longer be financially fragile. However, the events in USA since mid 2007 have refuted this conventional wisdom and has shown that excessive liberalization leads to creation of certain innovative financial products[38] that have created the incentives to relax lending criteria, to gamble using financial with no risk of lost as financial institutions located in different countries have been brought together in a complex web with the failure of one dragging down others and imposing a bailing out from taxpayers' money. Liberalization has then created a divergence between private risk management and social risk management and given rise a new form of market failure.

5. Conclusions

[38] e.g. securitization and credit default swap

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In this paper, we have discussed the pre-financial liberalization Keynes-Tobin growth models that favour government intervention in price and allocation of credit. The early discussions in the literature about the finance-growth nexus were presented. The McKinnon and Shaw hypothesis against financial repression policies and the refinements brought to in the light of empirical evidence following implementation of financial liberalization policy in various developing countries have also been discussed. These concern the role of Government, macroeconomic stability and sequencing. The unfolding of economic events after liberalization in many countries shows that the "ex-post" financial liberalization paradigm does not tell the whole story and remains subject to further revision.

In so far as the McKinnon and Shaw hypothesis is concerned the evidence points towards mixed results. Financial deepening has not increased at a higher pace after liberalization in several countries and the real interest rate did not often rise as expected. Neither the liberalization of the interest rate nor the liberalization of capital accounts has led to an improvement of savings in many countries. However, despite the poor performance record of such policies in many developing economies we are left in something of a theoretical and policy quandary.

On the one hand the theoretical insights thus far achieved have not yielded significantly robust empirical results in favour of financial liberalization. But on the other it is extremely difficult to identify a policy framework which simultaneously redirects resources to their (supposed) most productive use in developing economies without a 'failsafe' mechanism which protects them from serious disruption in their financial, product and labour markets. The recent financial crisis in USA where the financial system is well developed suggests that a new trade-off is to be defined to avoid the extremes of government obstructionism as well as market failures.

Both economic and financial liberalization remain the cornerstones of the IMF, the World Bank and the WTO and enjoy continued popularity within the policy making centres of many of the world's leading economies albeit only to the point where such a philosophy threatens any sectors within the latter. However, unless the global organizations begin to push for trade liberalization *between* developing countries and the powerful economic blocs of the EU and NAFTA then it will prove very difficult for the potential benefits of financial liberalization to ever be realized on a scale that will actually justify the drive towards it or the theoretical claims made on its behalf.

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