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The Determinants of Internal Reputation: A Study of Bahrain Research Scientists

A thesis submitted for the degree of Doctor of Philosophy at the University of Leicester

1996

by

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Abstract

The Determinants of Internal Reputation:

A Study of Bahrain Research Scientists

By Naima Faisal Al-Dossery

This study analyses the factors which determine the reputation of governmental research departments and/or organisations in Bahrain. Reputation in this context refers to the extent to which research scientists regard the department in which they work as a good place or bad place to practise science. Thus it is internal rather than external reputation which is in question.

Research scientists in departments within sixteen ministries and organisations were included in the study. The sample of 163 respondents was representative in terms of age, sex, qualifications and experience of the research scientists in the organisations covered. All the research scientists were educated to at least the level of Bachelor of Science (BSc) and in some cases had obtained a higher degree, Master of Science or Doctor of Philosophy.

The views of the research scientists were collected by means of a questionnaire which contained 98 Likert-type questions. The relationships between the independent variables and the dependent variable, reputation, were examined using correlation and multi-variate analysis.

The factors which contributed most to the perception of reputation were identified. Innovatory climate (INNO) emerged as the main determinant of internal reputation, job satisfaction (JSAT) as the second most important determinant, academic and scientific reputation (ACADM) as the third and working conditions (WCON) as the fourth determinant of internal reputation. The reputation equation with the contribution of each factor to the variance is summarised as:

Reputation: INNO (51.4%); JSAT (7%); ACADM (2.3%); WCON (1%).

This result confirms the result of the UK study by Jones (1996) which established innovatory climate and job satisfaction as the main determinants of internal reputation amongst R&D scientists in UK.

This thesis is dedicated to Jaber, Noora and Aysha

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Chapter One

Introduction

1.1 Origins and Argument

I started this investigation into motivation and its relation to job satisfaction and performance in governmental research organisations in Bahrain with a view to ultimately drawing some conclusions regarding good practice in the management of research scientists in that country. Research scientists are the most valuable asset of the research organisations and motivating them and making their work interesting and challenging in a creative atmosphere is important. To make the best use of people as a valuable resource, attention must be given to the relationship between staff and the nature and content of their jobs. The organisation of work and the design of jobs can have a significant effect on the job satisfaction of staff. Attention needs to be given to the quality of working life. The manager needs to understand how to make work more satisfying for staff and how to overcome obstacles to effective performance (Mullins, 1989).

In chapter 4 variables affecting the level of job satisfaction are discussed. These variables relate to personal factors such as education, age, sex and work experience; social factors such as group working relationship with co-workers; and organisational factors such as formal structure, nature of work, supervision and styles of leadership and working conditions.

These being the focus of my research I decided that it would be valuable to replicate in Bahrain a study carried out by Jones (1992a) on the concept of 'human resources reputation' amongst R&D scientists in certain high technology organisations in Britain, especially since it became evident that there was common ground between what he had done on the concept of reputation and what I was intending to do on the importance of individuals' attitudes to, and feelings about, their work.

Jones (1992a) commented on the relationship between reputation and job satisfaction that reputation is regarded as having very close links to job satisfaction and job satisfaction has a very strong influence on departmental reputation. And he stated that general job satisfaction had a very high correlation with reputation (0.604). In later work (Jones, 1996) he confirmed that internal reputation was determined primarily by innovatory climate and job satisfaction and concluded that working in an atmosphere which encouraged freedom and autonomy was essential to establishing departmental reputation amongst R&D scientists. Innovatory climate was the main factor in determining reputation and accounted for 29.7% of the variance (42.2%); job satisfaction was the second variable accounting for 6.6% of the variance.

Jones demonstrated by means of two additional regression equations, using job satisfaction and innovatory climate as the dependent variables, that, because of the close relationship between reputation, job satisfaction and innovatory climate, the independent variables are better predictors of job satisfaction or innovatory climate than of reputation. Therefore it was suggested to me that it would be useful if a comparative study examining this concept of reputation was carried out in Bahrain,

using the concept of 'culture' to explain any differences. This suggestion seemed sound and I decided to take it for several reasons, which will be discussed later in this chapter.

I also decided to consult the work of Hofstede (1980) on culture (see Appendix 5), in which he examined aspects of national and organisational culture in fifty countries and three regions, including Britain and a group of Arab-speaking countries.

1.2 Definitions: Reputation

In the literature the term reputation has been used to describe a variety of an organisation's attributes. The term normally refers to a company's 'image' or the reliability of its products. As Olins (1978) says: "The corporate reputation is formed from the behaviour and performance of hundreds or thousands of people and products in an organisation. If a corporate identity is to be successful it will, over a considerable period of time, help improve the performance of those thousands of people and products, and to that extent, and only to that extent will its influence be measurable." Dowling (1986) also takes a wide perspective, stating that "corporate audiences routinely rely on the reputations of firms in making investment decisions, career decisions, and product choices". Reputation can be aimed 'at the City' and potential customers as well as employees and potential employees.

This breadth of reputation is expressed also by Sullivan and Hogge (1987, p295). "Firstly, there was reputation in the eyes of employees and, secondly, there was reputation in the eyes of institutional shareholders". Other aspects of reputation

related to organisational behaviour are that it signals the firm's key characteristics to its 'constituents' (Spence, 1974); may impede management's ability to respond to environmental events (Caves & Porter, 1977); helps increase the compliance of existing employees (Kreps & Spence, 1985); and is a form of normative control (Fombrun & Shanley, 1990). However, the aspect of reputation on which my research focuses is the relationship between employees and their employer; that is, internal reputation.

Human resources reputation is defined as the extent to which scientists regard their R&D department as a good or bad place in which to work (Jones, 1992a). In my research I too was interested in identifying the perceptions research scientists had about their place of work i.e. the research departments they worked in, and the approach adopted by Jones seemed to be the best way of pursuing this interest.

How did the concept of reputation originate? It appears that it originated with labour economists who noted that firms attempting to control or cut labour costs generally maintained wage levels but reduced the number of employees. This phenomenon of wage fix - employment flex is referred to as implicit contract theory or, colloquially, 'sticky wages'. A number of labour economists have discussed reputation, such as Carmichael (1984), Okun (1981), Kreps and Spence (1985), and Weigelt and Camerer (1988), who in the main have regarded reputation as being linked to implicit contract theory (sticky wages). Sullivan and Hogge (1987) examined managerial practices related to R&D staff under recession conditions and found that implicit contract

theory held for such people: wages remained sticky and levels of employment were reduced.

Kreps and Spence (1985) suggest that enhancing 'employee welfare' not only increases the likely compliance of existing workers with managerial decisions but also sends signals to potential employees about 'working conditions and internal norms'. More explicitly, Stigler (1962) thought that firms which established good reputations for employee welfare would enhance their labour market position, attract better applicants and even cut unit labour costs.

Kanter (1983) and Guest (1989) used the concept of reputation in human resources management. Kanter (1983) called for a shift away from segmentalism to an integrative organisational design, arguing that segmentalism encouraged 'local rationality' in decision - making, a fragmentation which discourages problem solving and creates structural barriers which stifle entrepreneurship and the spirit of innovation. In contrast, the integrative approach aggregates problems, which creates unity, helps encourage creative solutions and loosens boundaries, so that the organisation becomes change-oriented.

Guest (1989) identified 'a number of foreign-owned and apparently successful firms with a reputation for their personnel/HRM policies'. These policies included: above average pay, mechanisms for individual expression of grievances, monitoring through communication systems and attitude surveys, and in some cases private health insurance and single status employees. Porter (1985) discussed the competitive

success of companies based on their relative technological skills, which are a function of many factors including: management, company culture, organisational structure and systems and company reputation with scientific personnel.

The literature on 'commitment' can also assist in understanding internal reputation as applied to professionals: the idea of employees being committed to, or identifying strongly with, their employer has clear similarities with the concept of organisational reputation. Employees identifying with their employer might be expected to rate their company's reputation higher than those whose identification or commitment is weaker, although, according to Guest and Dewe (1991), identification is actually a dimension of organisational commitment. The authors base their argument on the work of Fox (1974) who put forward three perspectives for the study of employee - management relationships: unitary, pluralistic and radical. Workers' loyalty can be to management (unitary); to themselves, to their work-group and union (pluralistic); or to trade unions and political movements (radical). However, Guest and Dewe suggest that the work of Etzioni (1975) points to the possibility of dual commitment, based on the concepts of calculative or moral involvement.

1.3 The Research Problem and Objectives

In the previous section I have argued that the concept of human resources reputation is a useful approach to understanding the factors that affect the attitude to their jobs of research scientists in research organisations in Bahrain.

The term reputation, as briefly discussed above, has been used to characterise a number of organisational attributes. There have been few attempts to either operationalise the term or to establish its antecedent. Jones (1992a) thoroughly established the links between the literature and the concept of reputation, prior to identifying the factors that determined the reputation of their work places amongst R&D scientists in ten high technology organisations in the UK. The main research problem is to establish the determinants of human resources reputation amongst research scientists in research organisations in Bahrain, i e to identify the factors which make the largest contribution to it, and then to consider the extent to which culture explains any differences when the findings of the present study are compared with those of Jones (1992a).

Organisations in the governmental sector in Bahrain which carry out scientific research in various fields, for example the environment, energy, economics, social questions and water management, are included in the study (chapter 2). Reputation is examined from the perspective of employees rather than management. The department in which the researcher works is taken as the unit of analysis to establish whether research scientists perceive their department to be a good or bad place to work. The aim is to establish what in the 'range of relationships' (Burrell, 1980) between scientists and their employer makes certain departments better than others in which to practise science.

Jones (1992a) put forward a number of hypotheses. The first and the second stated that the nature of work and managerial style would be the main factors in establishing

reputation. Although these two factors were later shown not to be the main determinants of reputation among the R&D scientists in Britain (Jones, 1992a), I examine the same hypotheses in relation to research scientists living in a different culture in Bahrain. Other elements considered important to employee/employer relationship are also examined: promotional opportunities, compensation/remuneration, working conditions, peer group relationships, identification with the organisation, general job satisfaction and innovatory climate.

On the basis of the literature, which shows the importance of job satisfaction, innovatory climate and working conditions (chapter 3), of the literature relevant to research scientists in Bahrain and in the countries of the Gulf Corporation Council (GCC) (chapter 2) of a preliminary survey carried out by myself (chapter 4), of some semi-structured interviews and of Jones's results, innovatory climate, job satisfaction, and working conditions are hypothesised to be the main factors in establishing internal reputation amongst research scientists in Bahrain. These hypotheses are tested by statistical analysis of the empirical data and the findings compared with those of Jones (1992a).

Data were collected from respondents by means of an extensive questionnaire distributed to scientists in governmental research departments and/or organisations in Bahrain with a letter seeking their co-operation in answering the questions with complete freedom and frankness and assuring them that all the information obtained would be confidential. The questionnaires were given to the respondents by their managers after I had discussed the objectives of my research with them. The

questionnaires were accompanied by self-addressed and stamped envelopes (chapter 4).

The other objective is to establish the extent to which there are differences of reputation according to the scientists' membership of certain social groupings. The hypotheses here are that:

a- those with a PhD qualification will rate reputation lower than those with lower qualifications;

b- older research scientists will rate reputation higher than their younger colleagues; and that

c- male and female will differ in their ratings (but the nature of the difference is not specified).

1.4 Justification for the Research

The justification for the research is, I believe, the contribution it can make to both the theoretical and the practical aspects of organisational behaviour. Fombrun and Shanley (1990) suggest that reputation is a concept which has been too little studied and recommend that future research should attempt to identify its characteristics. Jones in his research attempted to identify the dimensions of human resources reputation and to establish its antecedents among R&D scientists in Britain, thus contributing to the theory of organisational behaviour (OB). The application of Jones's procedure in the context of a different culture will make a further contribution to the literature on OB which should promote an understanding of the concept of reputation as an organisational attribute.

Secondly, it is hoped that from a practical point of view this research will help those concerned to understand the relationship between employee and employer and lead to some useful conclusions relating to the management of scientists in research organisations in Bahrain, since if this is done well it will contribute to the creation and maintenance of an enthusiastic, energetic, and creative group of scientists-which is a very difficult task (Sapienza, 1995). This is particularly important since, as mentioned in chapter 2, the research organisations have been recently established. Furthermore, some of the managers responsible for these organisations do not come from a research background, so there is a risk that factors perceived as important by the scientists if research is to be effectively carried out may not seem so important to their managers. The lack of proper scientific and technical background could result in the turning down of some creative ideas which appear to be a waste of money and effort to managers. Another problem is that there maybe a lack of recognition, as reflected in incentives and salary differentials, if those who produce high-quality work yet find themselves equated with those who work indifferently but are nevertheless considered productive by managers. And promotion may not be commensurate with the quality of work produced. Some managers underrate the importance of working conditions to the research scientists' output, in particular the organisation of the work itself and the physical conditions (poor labs, libraries, other facilities). Research scientists with a very high need for a sense of achievement perform best when their work is in demand. Therefore, investigation of the factors that can affect the relationship between scientists and their employers is essential not only for Bahrain but for the region as a whole. Effective leadership stems from having a good relationship with the group (Abaalkhail, 1988). Sapienza (1995) in this context

comments that there is ample evidence that a manager who can develop an organic organisation, characterised by (among other attributes) lateral relationships among scientists, can improve the creativity of R&D.

1.5 Techniques and Procedures

The fieldwork was based on information gathered from a total of 109 males and 54 females working as research scientists with a degree of bachelor or above, between 25 and 50 years of age, in all governmental research organisations in Bahrain.

The main instrument of data collection was a questionnaire. In addition to this there was a preliminary survey and a number of semi-structured interviews. Statistical procedures were used extensively through an SPSS programme for the analysis of the data to determine the extent to which each of the factors contributed towards the internal reputation of research organisations in Bahrain as perceived by scientists.

1.6 Outline of the Research

The following are brief details of the contents of each chapter.

Chapter 2

In this chapter the development of the educational system in Bahrain from the year 1919, which marked the establishment of the first modern public school, to the present time is presented. Also, I describe the various bodies that carry out research in Bahrain and the way in which they have developed over the years.

In this chapter I also discuss the various functions of management in research departments in Bahrain with a view to identifying the factors that can affect the attitudes of the research scientists and their perceptions of their place of work. I draw for this on material published in Bahrain and the other GCC countries.

Chapter 3

In this chapter I examine some definitions of research and discuss types of research with emphasis on R&D. By looking at the various functions of research management world wide I try to identify the factors that affect the attitudes of research scientists. I look at the characteristics of the people working in research with the same aim. I also examine relevant literature with a view to understanding what motivates employees and what attitudes result in high job performance.

Chapter 4

In this chapter I describe the methods used to obtain information. First, after discovering that there was a lack of information about expenditure on research, laboratories, libraries, the number of research scientists and the research carried out, I decided to conduct a survey myself to obtain this information (Appendix 1). I conducted some semi-structured interviews with research scientists and their supervisors in research departments in order to identify the problems they faced while doing their tasks (Appendix 2). Secondly, I describe the questionnaire used to obtain the responses of research scientists regarding their perceptions of their place of work (Appendix 4).

Chapter 5

In this chapter the data are analysed, beginning with reliability tests (Cronbach Alpha Coefficient) for each variable. If a variable appeared to be conceptually weak, principal components analysis was used to identify 'clusters' of items. Relationships between the independent variables and the dependent variable, reputation, were examined using correlation and multi regression analyses. Factor analysis showed the measure of reputation as consisting of the items: REP1, REP2, WCON12, WCON14, WCON19 and WCON20, which is slightly different from that identified by Jones (1992a). The data, as will be shown, proved to be very robust.

Chapter 6

The data are examined for differences between the various social groups within the sample. For example, do those with a PhD regard their department's reputation differently than their colleagues with a BSc? Are the responses of female research scientists different from those of their male counterparts?

Chapter 7

The results are fully discussed here and compared with Jones's results. I show whether or not the hypotheses are confirmed or disproved by the data. Also, I attempt to explain the differences in the results for the UK and Bahrain by considering the differences of culture based on the classifications of national culture put forward by Hofstede (1980).

Chapter 8

Finally, I state the conclusions to be drawn from the present research and point out some practical implications for the management of research scientists. I also suggest some possible lines of future research into the concept of internal reputation.

Chapter Two

Education, Research and the Management of Research Scientists in Bahrain

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Chapter Two

Education, Research and the Management of Research Scientists in Bahrain

2.1 Introduction

This chapter establishes the context for the research by describing the links between education, research and industry in Bahrain. I believe it is important to outline the state of industry and the economy, even if only briefly, and the quality of the labour force and its education, since the group of professionals being studied has originated from this labour force. By outlining the state of education and research in Bahrain, I hope to identify features of the educational system that might have an effect on research scientists at later stages of their lives.

Before 1932, the year when oil was discovered, Bahrain was mainly dependent on pearl fishing, agriculture and trading (Al-Muraikhi, 1985). During the last three decades it has changed from a society totally dependent on these activities to one in which the socio-economic structure, thanks to the oil revenue, has become more and more similar to that of economically more advanced societies and, by reason of its small population, a shortage has arisen of endogenous skilled manpower.

The economy of Bahrain has recently become more dependent on the service sector with the role of industry declining. This has led to the development of advanced skills and expertise in this field at the expense of scientific and technological skills.

Moreover, there is a lack of the large industrial concerns which provide a framework for preserving and developing the technologies of production.

These circumstances helped to delay research in Bahrain and research departments and/or organisations have been set up only fairly recently and have not yet had the time to grow and build their infrastructure sufficiently to embark on effective research. In the seventies a number of research departments were established in some ministries and governmental institutions, such as the office in the Ministry of Commerce and Agriculture which developed later into the Directorate of Fisheries (1974-1976), the economic research section in the Bahrain Monetary Agency which was established in 1973 and the Historical Documents Centre which is directed and financed by the Crown Prince's Office, and was established in 1978. In the eighties the number of research departments increased. Perhaps the first serious step toward scientific research came when the Bahrain Centre for Studies and Research was founded in 1981 to conduct scientific studies and undertake research activities covering all areas and to organise and co-ordinate research in Bahrain. The establishment of Gulf University (1979) and Bahrain University (1986), with their various scientific sections, laboratories and academic expertise, also provided a good environment for research.

Given the lack of references and scarcity of information about the management of research and scientists in Bahrain, I had to refer to the Gulf Corporation Council (GCC) States. The justification for this was that in the GCC (Saudi Arabia, Bahrain, Kuwait, Qatar, Oman, United Emirates), research activities started at more or less at

the same time. And the educational background and social circumstances prevailing in those states are the same since they have the same culture, language and religion.

Brief Overview of Bahrain

The state of Bahrain (Statistical Abstract, 1992) is located close to the southern shore of the Arabian Gulf between latitude 25 32 and 26 20 North and longitude 50 20 and 50 50 East. It lies some 22 km off the Eastern Coast of Saudi Arabia and slightly further from the Western Coast of the Qatar Peninsula. It is linked with Saudi Arabia via the King Fahad Causeway which has been opened in November 1986.

Bahrain comprises some 36 islands, with a total land area of about 695.26 square km. The largest of these is Bahrain where the capital city, Manama, is situated. Bahrain Island accounts for nearly 85% of the total area of the State of Bahrain.

Bahrain is low lying, with a maximum elevation of 134 meters. Apart from a narrow fertile strip along the North and North-Western Coast, it is generally rocky and bare. The limestone bedrock is covered with varying depths of sand which supports little vegetation other than a few tough desert plants. The winters are cool with sparse rainfall and the summers hot with high humidity.

Most major economic undertakings are situated in Manama, such as the main sea port (Mina Sulman) and the financial centre. Muharraq island is the second most important island, on which the Bahrain International Airport and the Arab Shipbuilding and Repairing Yard are situated. The third main island is Sitra where

the oil refinery, the aluminium factory, oil and aluminium exporting ports and industrial complexes are located. Gulf Petrochemical and the new industrial area are also situated there.

Table 2.1 Total Bahraini Population, Bahraini Population with a Minimum of Secondary Education and the Illiteracy Rate for 1981 & 1991

Year	Bahraini Population		Population With a Minimum of Secondary Education		Illiteracy Rate	
	Male	Female	Male	Female	Male	Female
1981	119,924	118,496	15,642	11,066	21.2%	41.4%
1991	163,453	159,852	36,433	30,386	11%	23.9%
% Change	+ 35.6%		+ 150%		- 27.7%	

The total population of Bahrain was 508,037 inhabitants in 1991; expatriates represented 36% of the total. Males represented 57.9% of the total population and females 42.1%. As can be seen from table 2.1 (Statistical Abstract, 1992), the indigenous population, which represented 63.6% of the total, increased between 1981 and 1991 by 35.6% and the educated Bahraini population (i.e. with secondary education and over) increased by 150% in those ten years. The illiteracy rate decreased by 27.7%.

Table 2.2 (Statistical Abstract, 1992) demonstrates the distribution of the Bahraini graduates with a minimum of secondary education and the increase in the number of

students at each level of qualification in the period 1981 to 1991. Table 2.2 shows very clearly the tremendous jump in the number of Bahrainis with the various levels of qualification. Over a period of ten years at the lower qualification levels i.e. secondary and Diploma, the increase was 156% and 51.7% respectively. At the degree and the post graduate level, BSc, MSc and PhD, the increase was huge; 188%, 768% and 564% respectively. Notable is the increase in the number of postgraduates in this period in which there was pressure on the various organisations to comply with the policy of Bahrainisation and to adopt programmes of training and qualifying Bahrainis to replace the expatriate work force in various fields.

Table 2.2 Qualifications Distribution Among Bahraini Population for 1981 & 1991

Year	Secondary	Diploma	BSc or BA	High Diploma & Master	PhD or Equiv-alent	Total
1981	18876	4549	2921	320	42	26708
1991	48454	6902	8404	2780	279	66819
+%	156%	51.7%	188%	768%	564%	150%

Bahrain has been aware that in order to improve its economy it should not depend on oil alone, especially since the oil resources have dwindled over the last two decades. Bahrain Aluminium Company (ALBA), established in 1968, has been one of the more successful attempts at diversification. It has been instrumental in helping the economy and substantially reducing dependence on oil income. In 1974 the Arab

Shipbuilding and Repair Yard was established and in 1979 the Petrochemical Company and the Bahrain National Gas Company.

Given its central position in the Arabian Gulf between Europe and India and the Far East, Bahrain has become a strategic place for refuelling long range aircraft. This as well as tourism has boosted its income. Moreover, thanks to its location in a favourable time zone and its ability to deal with various money markets in the Far East and Europe simultaneously, Bahrain has become an important financial centre.

Table 2.3 Bahraini Population Employed with a Minimum of Secondary Education for 1981 and 1991

Year	Secondary		Diploma		BSc or BA		Higher Diploma & Master		Doctorate		total	
	M	F	M	F	M	F	M	F	M	F	M	F
1981	10805	4920	--	--	1668	864	250	41	--	--	12723	5825
1991	19129	5361	3252	2186	4403	2945	1690	798	213	50	28687	11340
%ch.	55.7%		___		190%		755%		___		115%	

These factors have created a vast number of work opportunities and a greater demand for skilled and semi-skilled manpower than the native population is able to satisfy. This provides a stimulus for improving the skills of the labour force. Table 2.3 (Statistical Abstract, 1992) gives the figures for the employed Bahraini population with at least secondary education.

From table 2.3 it can be seen that the increase in the number of Bahrainis employed between 1981 and 1991 was 55.7% for the secondary level, 190% for the BSc or BA level and 755% for the higher diploma and master level. There are no figures available on employment at the Diploma and Doctorate level in 1981. Nevertheless, the figures in table 2.3 validate the point made earlier about the policy of Bahrainisation.

Female participation in the labour force fell from 31.4% of the total in 1981 to 28.3% in 1991, which still represents a sizeable proportion. In chapter 4 hypotheses regarding the views of members of various social groups, including men and women, will be stated.

Table 2.3 also shows that the numbers of holders of secondary school certificates, diplomas and BSc/BA degrees are much higher than those with higher degrees. The total of Bahraini professional* and technical workers in 1981 was given as 8065 (males 4669, females 3396), while in 1991 these totalled 16,948 (males 10209, females 6739), an increase of 110%. As a proportion of the Bahraini population these figures represent 7.8% in 1981 and 12.4% in 1991. And according to a survey of university graduates (BA/BSc holders for the period 1975-1987) carried out by Bahrain Centre for Studies and Research, graduates specialising in technological,

* It has been mentioned that the category of professional and technical workers consists of teachers (schools & universities), engineers, computer analysts, specialists, economists, accountants, lawyers, chemists, workers in medicine, biologists, authors & journalists, artists, translators, social research scientists, directors, musicians, librarians, mathematicians, workers in archaeology (Al-Bash, et al, 1991, p10).

applied and pure sciences constituted 32% of the total (on the basis of 1764 questionnaires) (Albash, 1991). These numbers show how education and its output have developed over a ten-year period, a very important process if the human resources needed for industry and research are to be provided. In the following section the historical development of education in Bahrain will be presented prior to a discussion of the progress and scientific research, which could have not taken place without that development.

2.2 Education in Bahrain

Hammood (1987) and Al-Hamer (1968) in their study on the history of education in Bahrain state that the year 1919 marked the foundation of the first public boys school in Bahrain, to which a number of notables in the Bahraini community contributed. The first committee of education was composed of several leading Arab merchants. The schools' curriculum was partly religious and partly adopted from the syllabi of some other Arab countries. Most of the teachers were brought from Egypt, Syria and Lebanon. In addition, some teachers were later brought over from Basra in Iraq. From 1925/26 - 1930/31, the government paid a monthly subsidy to the 'Education Committees', which were given a free hand in running the public schools. But in 1932, partly because of some misappropriation of funds, the schools were placed under the direct control of the government. By the year 1940 practically all the public schools had been established at the elementary level.

In 1960/61, the intermediate education level was added and in 1971/72 it was decided to make it part of the basic education.

Secondary education started in 1940 for students who had completed primary education. It lasted for three years and this was later extended to four years; and in 1960/61 it was reorganised as general education (art & science), and technical and commercial education and a program for qualifying students to become teachers was instituted. Technical education started effectively in 1958, supervised by the government. During the 1960's it was extended to secondary education level and in 1969 intermediate technical education was cancelled and specialisation postponed until the age of fifteen to give the students a chance to acquire more knowledge and the background to help them choose the right stream. Commercial education started in the early 1960's and in 1966/67 it was decided to give students a secondary commercial diploma. In 1974/75 commercial education was linked to the Pitman International Institution so as to give it an up-to date curriculum. Islamic education was started formally by the government in 1960 and promoted to secondary education level; and the Islamic Institution was founded. At present such education covers the primary level (starting from class four), the intermediate level and the secondary level.

In 1940 a program was launched for qualifying students who had graduated from primary schools to become teachers. In 1947 evening classes were opened for in-service training of teachers to improve their skills. In 1961 it was decided to send the best students to the American University in Beirut for short training courses during the summer.

In 1966 higher education started with the establishment of the Higher Institute for Teachers to improve their skills and to qualify them through a two-year diploma

course after secondary education. In 1968 the Gulf Technical College was established. In 1978 the University College of Science, Arts and Education was formed, and in 1986 amalgamated with Gulf Polytechnic (originally Gulf Technical College) to form the nucleus of Bahrain University. In 1987 the new organisation of Bahrain University was introduced. There are four colleges: the College of Business Administration, the College of Arts and Science, the College of Engineering and the College of Education, offering qualifications ranging from certificates and diplomas to bachelor and post-graduate degrees. And there are MBA and MSc programs (Catalogues, 1989-1992). There were 6000 full and part-time students in 1991.

In 1976 the Ministry of Health founded the college of Medical and Health Sciences which is the first of its kind in the Arabian Gulf area for training nurses and health technicians to meet the manpower needs of the health services in Bahrain. The college offers qualifications ranging from certificates and diplomas to bachelor degrees. The total number of students in 1991 was 643 (males 130, females 513) (Statistical Abstract, 1992). The Arabian Gulf University (Catalogues, 1991-1993) was established in 1980 as a joint university for the Arabian Gulf States (Bahrain, Kuwait, Saudi Arabia, Iraq, Oman, United Emirates and Qatar). Its aims are to orient its programs and curricula to meet the cultural, scientific and occupational needs of the contributing states and to contribute to the elaboration of scientific and practical solutions to the problems of development. The University has three colleges: the College of Medicine and Medical Sciences, the College of Applied Sciences, and the College of Education, and offers qualifications ranging from bachelor degree to

doctorate. The total number of Bahraini students in 1991 was 191 (males 77, females 114).

Lecturers in Bahrain University and the Arabian Gulf University carry out research in the process of supervising post-graduate students, or through contract work on behalf of research centres independently of the universities, or through their personal endeavours. The research department which lack laboratories and expertise are incomplete, utilise the facilities of the universities. And these centres support the research done in the universities and consult with them on matters related to research.

2.3 Research in Bahrain

Bahrain's interest in developing a scientific environment derives from its belief that this is the main means of developing the productive and human resources required for socio-economic development. In today's world it is scientific and technological achievements that are the true indices of development.

Research is relatively new in Bahrain. The first research departments were established in some governmental ministries and institutions during the seventies as small cells within those establishments. During the eighties the number of research departments increased and Bahrain University was restructured and reorganised after its inception in 1986 by the merging of its colleges. The creation in 1981 of the Bahrain Centre for Studies and Research was the first serious step towards the development of a programme of scientific research in Bahrain. The Centre was intended to carry out studies in various fields in an effort to strengthen research and

keep up with advances in science and technology in the interests of development plans for Bahrain and to co-ordinate, support and encourage research activities generally in Bahrain.

Another important step was the creation in 1989 of the Committee for Scientific Research at the University of Bahrain with a view to evaluating and encouraging research in the service of the community, in particular by the university staff since involvement in basic and applied research would keep them abreast of new developments in science and technology.

In 1968 an office was established in the Ministry of Commerce and Agriculture to carry out research. In the period 1974-1976 it developed into the Directorate of Fisheries. Its function is to study the fisheries sector and to conduct surveys and researches with a view to improving the fisheries environment and increasing the quantity of fish it will yield. In 1973 the Directorate of Economic Research, financed by the Bahrain Monetary Agency, was established. It carries out research related to the government's objective of extending the national economic base and the diversity of the sources of national income. The Al-Areen Wildlife Sanctuary was set up in 1976 to help preserve Arabian wildlife threatened with extinction. A team consisting mainly of Bahraini staff provides advice and guidance and carries out some limited research. In 1978 the Historical Document Centre was established to record the history of Bahrain through the collection of original source material in the shape of books, documents, manuscripts, reports and pictures from within Bahrain and from outside. The Centre has published many useful studies. The Environmental

Protection Committee (EPIC) was founded 1980. It has played a big role in developing and implementing environmental legislation such that relating to air and water quality, air emission and liquid effluent discharge and pollution control.

In 1981 the Bahrain Centre for Studies and Research was established. Its plans and policies are drawn up by its Board of Trustees chaired by His Highness, the Crown Prince. The Centre conducts studies and undertakes research activities in all areas, particularly those related to technology, with a view to keeping abreast of scientific progress in the service of Bahrain and the world at large. It also seeks to co-ordinate, support and encourage scientific and theoretical research activities and to assist research in the areas of science and technology and economics. In 1991 the role of the Centre was extended by an official decree to include suggesting what national policies and strategies should be adopted to promote scientific and technological activities and what priorities should be set in the fields of production and services in order to advance socio-economic development. The Centre carries out joint and contract research and supports scientific research projects by providing funds and scientific and technical information. Examples of its scientific support schemes are the Crown Prince's Scientific Research Award Scheme to motivate research scientists to undertake serious and distinctive scientific studies related to the needs of the local community and the short-term Scientific Scholarships Scheme for research scientists which enables them to go on short-term overseas scholarships during which they conduct scientific research useful to Bahrain or undergo training in the use of advanced equipment not available in Bahrain.

In 1981-82 the Directorate of Organisation and the Labour Force was established. It is directed and financed by the Civil Service Bureau, which formulates the rules and regulations for the management of the official labour force and seeks to maximise the effectiveness of the government services. The aims and objectives of the Directorate are to ensure that responsibilities and titles within the government service are distributed correctly and that duplication is avoided and to specify the number of staff for a particular function; and to study the effectiveness of the government services and then to revise the organisational structures as necessary.

In 1983 the Department of Educational Evaluation and Curricula Development Research was founded in the Ministry of Education. Its main aim is to carry out studies with a view to developing the educational curricula and to planning teaching strategies. Also in 1983 the Directorate of Evaluation and Economic Research was established. It is directed by the Ministry of Finance and the National Economy. Its aims are to participate in producing studies related to the most important economic projects to Bahrain and to follow the performance of the various economic sectors and to issue economic indicators. The directorate also consults foreign governments, by means of contract studies if necessary, and then evaluates the suggestions made for improving such sectors as agriculture, transport and fisheries. The Educational Research and Development Centre was established in 1988 in the Ministry of Education. It carries out research into possible means of developing and improving the efficiency of the educational system. The latest research organisation established is the Directorate of Agriculture Research in the Ministry of Commerce and Agriculture. It was established in 1990. Its main aim is to do research and provide

consultation regarding the introduction and development of agricultural products suitable to Bahrain's climate, in order to increase yields, improve the quality of products and to realise self-sufficiency. It also carries out studies in the field of cross breeding of local cattle species with superior species from outside Bahrain, so that more productive breeds can be obtained.

2.4 Research Planning

In the introduction it was pointed out that one of the objectives of the study is to determine the factors that affect the attitudes of research scientists and the extent to which they see their place of work as being a good or bad place to practise their profession. In this section I will, by examining the literature on the management of scientists in research departments in Bahrain (and sometimes in the region since as mentioned earlier much of the supporting material had to be drawn from studies in the GCC, with the justification that many of the circumstances and the culture are shared by its members), try to identify the short comings that can lead to dissatisfaction amongst the people involved. This can for instance result from bad planning and training, the unavailability of information, poor communication and lack of co-ordination.

Many of the statistics quoted in this chapter have been accumulated by myself since there was little dependable information available on the research infrastructure in Bahrain. For this purpose I designed a questionnaire to obtain information on such matters as research backup facilities, expenditure etc. For more details see appendices 1 and 2 and section 4.3 of the methodology chapter (Chapter 4). I will start with a

brief history of the development of research organisations in Bahrain before discussing planning, training, organisation and funding, the availability of information, and the lack of rewards and incentives.

Managing people has always been a difficult task for it involves many variables, some related to peoples' characteristics as individuals and some to the organisations they work in, and some to the society they live in. "The management of people involves many kinds of problems: psychological, social, philosophical, ethical and physiological" (French, 1982, p5). Workers' effectiveness is determined largely by the way they are managed (Drucker, 1977). Organisation and the management of people at work are intimately related. An organisation is a system, having an established structure and conscious planning, in which people work and deal with one another in a co-ordinated and co-operative manner for the accomplishment of recognised goals (Beach, 1980).

In Bahrain, a majority of organisations were established in the "gold rush" fever of the 1970s as little more than ad hoc set-ups designed for short-term operations in an environment rich with opportunities (Al-Hashimi, 1986). As such, they tended to be highly centralised and unsuited to the painstaking tasks of building management infrastructures or embarking on serious management development. At the time there was little choice but to divert some of those who had distinguished themselves in other professions to the management of such establishments because senior decision-making positions in government ministries and private businesses were already suffering from a lack of the managerial talent required for the broader planning and

control roles. In view of this, Bahraini engineers, physicians and accountants rose in their respective organisations to occupy the upper echelons that had little use for their previous professional backgrounds (Najjar, 1986). But given the rapid organisational proliferation it is undoubtedly the case that no amount of "conversion" of other professionals into management positions could have satisfied the growing demands for supervisory personnel during the 1970s. Subsequently, substantial numbers of young Bahrainis were attracted to various management education and training programs to obtain supervisory qualifications.

Bahrain, as mentioned earlier, is new in the field of scientific research. Although interest in research is increasing gradually research organisations suffer from the worst type of bureaucratic management. Bad planning and weak co-ordination have become characteristic of these organisations. This and other acquired weaknesses have resulted in all but a few research departments failing to realise their goals. In what follows I will attempt to highlight the most important problems that face research scientists in Bahrain and suggest some solutions. The problems and obstacles must be overcome through planning and organisation and the adoption of the right employment policy for research scientists together with the budgets needed for their work. This calls for better understanding of the obstacles and an effort to trace their causes and effects. The sources of the information presented in this chapter are the preliminary survey and some semi-structured interviews which I carried out with scientists and their supervisors in some of the research departments in Bahrain, in order to identify the problems that the scientists face in their work and the expectations they have of their jobs (see Appendices 1 and 2).

"Planning is the dynamic process of making decisions today about future actions" (Hellriegel and Slocum, 1989, p259). Planning is essential in order to define the objectives of any organisation and find the right mechanism to achieve them. Planning effectively means orienting the programme of work to the purposes it is intended to serve, because organisations survive only if they can simultaneously manage change, maintain stability, and keep a sense of direction. In the field of research there ought to be a clear policy which integrates the mechanisms serving the goals of learning, education and culture on the one hand and socio-economic development on the other. Where there is such a policy the maximum benefits can be drawn from the research for national development.

Effective research is no longer a solitary effort. On the contrary it is an organised and co-ordinated undertaking by groups of people and institutes of science and technology in which national aims are translated into integrated scientific and technological programmes. Planning for research is the essential means of directing the national scientific potential towards achieving the greatest possible efficiency of performance. And it directs that potential towards realising the goals of development plans and serving their scientific and technological needs. Correct planning for research should not be limited to applied research. While dealing with issues of production and socio-economic development it should concern itself with basic research which may reveal future applications of science and lines of development and growth (Al-Meyah, 1981).

In Bahrain co-ordination between research organisations and the university is poor. For instance, the Bahrain Centre for Studies and Research was at one time working on a large-scale project on water resources and another research department in Bahrain started working on the same problem without consulting or co-ordinating with BCSR, risking reinventing the wheel at the expense of limited resources. One of the researchers in the research team at Orgn 4 commented:

> *"Would it not have been better if they co-operated with us. We could have combined our resources and achieved more".*

The same goes for certain studies on pollution. Even within one organisation a number of projects have been pursued in the same general area that do not follow a common trend or goal. This can easily be seen if one looks at the titles of published studies. This poor co-ordination is also evident between the educational institutions and the research departments in ministries and organisations. The first specifies its research policy within a framework it defines as academic freedom while the second sees no choice but to do research related to the needs of socio-economic development. So every party researches what it thinks is important and timely in the absence of a unified central plan for research at the national level. This, needless to say, leads to duplication and wastage of finance and effort; and what makes the situation even worse is the fact that each party holds on to the findings of its researches and regards them as its own property, thus depriving interested research scientists of the benefit.

All this has had adverse effects on the morale of the research scientists and created an atmosphere of disillusionment and dissatisfaction. Over the years there have been

many incidents exemplifying this situation. In the BCSR research scientists have often complained about researchers in other organisations carrying out research already done or in the process of being done at the Centre, which could lead to their losing their claim to have carried out the research and possible the right of authorship when publishing the work, or to their getting into controversy over the issue. Researcher x complained:

> *"It is heart breaking. I have spent two years researching the topic. It should have been I who published it. I have lost a good opportunity for promotion."*

They also complained that the duplication of work wasted limited resources which if properly targeted would allow more in-depth research to be carried out and give them an opportunity to use their expertise and training to the full. Moreover, the relationship between the higher education institutes and the departments of research in the ministries is sometimes conducted at the top level and is sometimes competitive. The institutes of higher education think that their role is to do basic academic research while the other institutions believe that their role is to do research leading to solutions to the problems of production and services provision in Bahrain. The question is, however, how is it possible to do applied research separately from the basic academic research which supports it? (Abu-Shaikha, 1986).

One of the most important reasons for the situation outlined above is that Bahrain still does not have a higher council for research which can draw up plans and co-ordinate research policy, even though the BCSR has been given the role of suggesting what

national science policies and strategies are required and what the priorities should be in the fields of production and services in order to promote socio-economic development, since this role has not been implemented yet (personal interview).

This is the case in most Arab countries and is attributed to the absence of governmental research policies (Legislation on Scientific Research and Status of Researchers in the Arab World, 1986) which can help in the taking of decisions related to the creation of autonomous national research councils consisting of capable scientists, representatives of the main scientific institutions, political leaders and representatives of sectors benefiting from research (Al-Hashimi, 1986). The task of such councils is to provide overall umbrella for research planning at various levels, thus preventing duplication and wastage of both human and material resources. They can be consulted in the drawing up of research policies, while establishing and managing national research and laboratory centres, supporting research in leading fields, co-ordinating it at the different levels, providing media and documentation facilities, assessing research findings for practical implementation, improving the organisation and management of research and, most importantly, surveying the human resources available and forecasting future needs.

Al-Meyah (1981) has suggested setting up a two-stage research plan, which would fall within the work of the one of the special committees that can be formed by the council mentioned above to look into the problems of setting priorities in accordance with the national plan and looking into scientific and technological capabilities.

To sum up, planning for research at both the national level and at the level of individual institutions is important for the effective utilisation of resources. Proper planning of research activities can help the economy of the country at the national level and improve the effectiveness of research scientists in research departments, which in the long run will help socio-economic development as a whole.

2.4.1 Planning for Training and Development of Research Scientists

The availability of a qualified and capable cadre to operate the various facilities is a crucial necessity for development and advancement. Qualifying a cadre in this sense means that different scientific and technological levels of training must be available for every sector and the economy and every service or production project. Therefore every research plan must include a programme for training and qualifying research scientists.

This is followed by the role of research institutes in the training and qualifying of scientists. One of the most important elements that these institutes must concentrate on in the training of research scientists is encouraging and facilitating their participation in scientific conferences and workshops, since the productivity of a research scientist depends to a great extent on his having a systematic knowledge of the work and findings of his colleagues. Scientific conferences provide an excellent means of achieving this and play an important role generally in the development of researchers. Free exchanges of ideas and discussion of the best solutions to common problems is characteristic of such meetings, which are planned all year round in the

advanced countries so that every professor or research scientist has a number of them on his agenda at local, national or international level (Abu-Shaikha, 1986). The societies in which research scientists meet provide a unique opportunity for members to get to know each other and give them a chance for discussion and exchange of information on the progress of their researches from which everybody stands to gain. Unfortunately most of the organisations concerned with research in the Arab world seldom organise scientific conferences to deliberate on a specific topic. Moreover, they very rarely send representatives to regional and international conferences on the grounds that such participation is no more than a kind of tourism and convalescence (Abu-Shaikha, 1986).

Unfortunately the lack of a national training policy has resulted in training being to some extent left to the organisations themselves, with the result that there is a shortage of certain specialisations and a glut of others. This no doubt hinders effective planning. I have found (personal interview) that some departments rely on foreign consultants for the preparation of technical and feasibility studies. This incurs expenditures which could be allocated, with careful planning, to the training of Bahraini research scientists. Furthermore investment in training now will save a great deal later. Also there is the problem of unplanned transfers of technology which occur without the work force which is going to use these new technologies in the form of machinery or control processes being properly trained. On this subject the director of the scientific research council in Iraq said: "Research centres and research scientists have a big role to play in the field of transfer of technology and a great deal of interaction between research and the universities and consultation bodies is required

to plan and train people and to provide systematic information, if transfer of technology is to be successful and productive for the country" (Khaleel and Al-Hamadani, 1986, p138). It is, therefore of paramount importance to plan for the training of research scientists at different levels in order to have the technically trained manpower. This can be achieved through proper attention to the following (Abdul-Razaq & Al-Hamadani, 1981, p166):

1- Assessing the current and future need for particular specialisations, qualifications and skills.

2- Identifying the bottle-necks that hold up production and the provision of services and the effects of shortage of manpower and its level of training on these bottle necks.

3- Assessing the current levels of training, the state of the training centres and schools available and the curricula in these institutions.

4- Establishing what training is available in industry and services facilities.

5- Assessing what highly qualified personnel are required by the country to train the cadres needed and what is the current state of the universities and institutes of higher education and their curricula.

2.5 Research Organising

It is important to have a sound organisation if objectives and plans are to be transformed from abstract ideas into tangible reality. The process of organising involves dividing the work that has to be accomplished and assigning particular tasks to individuals, groups, and departments. Management has come to realise that organisations must be dynamic in nature; that is, they must be capable of rapid restructuring should environmental factors so dictate (Kerzner, 1992), factors such as changes in technology and in the course of social development. In research

establishments, the nature of the work involved dictates the kind of organisational structure which is needed. If the structure is not compatible with the nature and needs of the work, problems will result. In organisations great care must be taken to ensure co-ordination and co-operation among the various research departments. And co-ordination and co-operation amongst the various research establishments at the national and regional level is also essential if potentials and capabilities are to be fully exploited..

The Gulf Co-operation Council, which exists to promote co-operation in various fields, scientific research being one of them, has called for co-ordination of work in this important field with a view to achieving the following goals (Al-Mutraf, 1989, p68):

- saving on financial and human resources by avoiding duplicated and repetitive researches.

- exchange of experience and findings among the various research organisations.

- increased awareness of each others capabilities and research potential so as to maximises the benefits.

- consultation about common research.

- formation of research groups linking different organisations.

- the quick exchange of results through co-ordination and information sharing.

- the convening of scientific seminars, study groups and regional conferences.

- the strengthening of ties among the various research centres thus realising the goal of co-operation and co-ordination.

In the contemporary world scientific advancement is inseparable from to co-ordinated planning and the setting of clear goals. The reasons for the relative scientific and technological backwardness of the Islamic world today is attributable to various causes but one of them is certainly the absence of the necessary degree of co-operation among institutions of scientific research (Al-Mutraf, 1989).

Universities have a big role to play in the co-ordination of scientific research through their academic expertise, their laboratories and technologies and the other resources available to them. Unfortunately the fact of the matter is that co-operation among the universities in the GCC has not reached the desired level. For instance there is no programme for exchanges of visits by research scientists or the carrying out of co-operative research. A member of the teaching faculty in one of these universities consider that the framework of co-operation among them should go beyond courtesy visits to simply look at each other's achievements, to include more important aspects such as sharing the experience gained during their development (personal interview). There is duplication and repetition, which may be due to the similarity of the problem they face. This ought to be taken care of by research organisations distributing responsibilities and work loads amongst themselves according to their specialisations, laboratories and human resources. Al-Khooly (1988) argued that applied research must be carried out in regional centres serving all GCC countries, since none of these countries on its own would be able to carry out any applied research effectively. Fortunately this can be carried out under the organisational umbrella of the GCC. Although there is a lack of co-ordination and co-operation among research organisations, efforts have been made through meetings of research officials at the

Arab world or GCC level to create common ground for co-operation. The obstacles that face research at these levels can be summarised as:

- Lack of funds.

- Inefficient administration.

- Shortage of research scientists.

- Shortage of research assistants. For instance at BCSR in Bahrain it is common-place to find a research scientist doing basic measurement or chemical analysis or even plotting curves and doing typing (personal interview).

- Poorly equipped laboratories and workshops.

- The absence of a clear research plan in each Arab country and for the Arab world as a whole.

- Failure to relate research and the problems of development. For instance one finds that research is directed towards solving minor tasks while the real problems that face national development plans are neglected.

- Inadequacies of libraries and the means of disseminating information.

- Weaknesses in the mechanisms for exchanging information between research centres in the Arab world and those in the advanced world.

Abdul-Rahman (1987, p16-17) and Al-Mutraf (1989, p50) identify similar obstacles to the progress of research in Qatar and Saudi Arabia:

- The trend in research centres and universities lacks the concentration on scientific and applied research.

- Members of the teaching faculty in the universities are inexperienced.

- The universities are deprived of qualified people by the ministries and other institutions which offer better pay and prospects of promotion.

- Faculty members lack the stimulus of working in a broad scientific environment.

- Shortage of translations of scientific work and information on foreign research.

Organising research at the regional level is as important as at the national one, since this provides opportunities for the individual research scientist to develop his career through working on integrated, in-depth and well-supported research projects. In addition, the sense of achievement from working at the regional level can lead to satisfaction which motivates him and raises his efficiency and productivity.

A survey carried out by Al-Mutraf (1989, p88-89) on co-operation among research centres in the universities in the states of the GCC illustrate this. There were responses to 30 out of the 41 questionnaires distributed and the analysis yielded the following important points:

1- There was no co-operation in research at the required standard. Only 20% of the centres had carried out some co-operative research during the previous five years. But currently 17% of the centres were studying proposals for co-operative research and 83% of the sample were not participating in any co-operative research at the time or thinking of doing so in the near future.

2- 60% of the sample saw that co-operation in doing research on specific scientific matters led to better scientific results, while 40% of the sample considered that there was no need for co-operation to get better results.

3- 77% of the sample believed that there was no co-operation at the time among people working in centres and institutes of research.

4- 67% of the sample reported that no meetings took place among research scientists in the GCC and 33% reported the contrary. However, it seems that no research resulted from such meetings as did take place since 87% said that they resulted in no research co-operation.

5- As for scientific conferences, 87% of the study sample stated that there were not enough of them.

6- Some 40% of research centres in the GCC co-operated with research centres, institutions and corporations outside the GCC and 60% did not.

Some of the comments made by the people concerned in the universities surveyed are quoted below (Al-Mutraf, 1989, p90) to highlight the kind of obstacles that hinder the organisation and development of scientific research in this part of the world:

- The Dean of the college of science in Kuwait University commented that "none of the recommendations made by the meetings of Deans of colleges of science in 1987 and 1988 with respect to co-ordination and co-operation in research have been implemented."

- The director of the research centre for deserts and marine environment in the United Arab Emirates commented, on meetings and exchanges of visits among research scientists, that "these meetings have helped us to learn about the various scientific activities that are carried out in these centres and the results of the research, in addition to assessing the scientific and technical potentialities and the means of making use of them."

- The director of the centre of educational research in Qatar University commented that "this kind of meeting leads to co-ordination and integration among people responsible for research through the exchange of expertise and information about each others research trends."

- The director of the research centre for the management sciences in Saudi Arabia commented that there was no co-operation in its true meaning between his centre and other centres in the GCC despite the fact that his centre carried out some research important to the countries of the GCC.

- The Dean of the college of engineering in United Arab Emirates (UAE) University commented that "co-operation and co-ordination can lead to improved efficiency in performance and save material and human resources; and since the countries in the GCC share a lot, co-operation and co-ordination are essential in everything, especially research, which can be regarded as a long-term investment."

- On the subject of scientific conferences, the Dean of the college of education in UAE university commented "the conferences that are convened are relatively few in number, most of them are convened for organisational or institutional reasons and very few are concerned with the development of research on social or scientific problems or co-ordination and the responsibility for carrying out corporate research."

In summary therefore, there is a consensus that more co-operation and exchanges of ideas and expertise in the field of research are essential for the welfare of the GCC countries; and also that the convening of conferences is an effective means of exchanging findings of common interest.

2.6 Lack of Supportive & Administrative Services

Research scientists have to devote most if not all of their time to research and need to have effective administrative support as well as the assistance of a specialised group of research assistants whose main task is to relieve them of routine work. It is noticeable that in research organisations in Bahrain there is a shortage of facilities, of administrative back-up and of research assistants, which all leads to a waste of research scientists' valuable time. A researcher in Minist 8 expressed his dissatisfaction to a fellow researcher about the shortage of lab technicians:

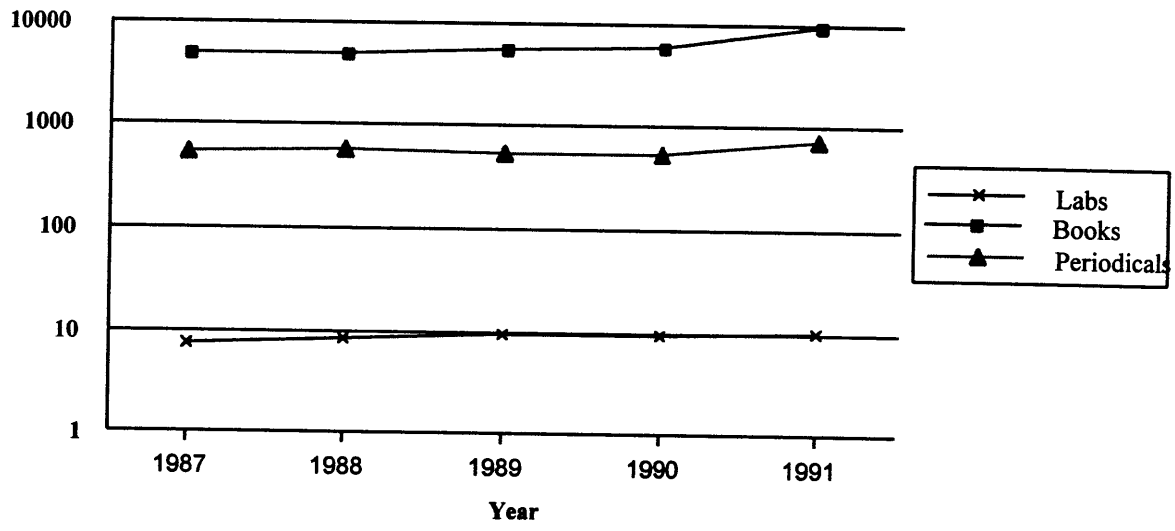
> *"How do they expect us to do research. I have spent so much time in the lab carrying out some basic chemical analysis."*

I carried out a survey (see Chapter 4) in order to investigate the back-up facilities in the departments to be included in the study sample. Such things as the number of books, journals, and periodicals provided in the libraries of those departments were checked and also the number of laboratories. The statistics are shown in appendix 1.

Figure 2.1 summarises the statistics for the number of laboratories, periodicals, and books over the period 1987-1991. The number of labs and periodicals did not change significantly, in contrast to the number of the books in the libraries of the research

departments which showed a marginal increase up to 1990, after which there was a significant jump in 1991. This sharp rise can be partly attributed to the increase in the number of books ordered by the BCSR for the major research projects that it embarked on in 1991, such as the water and building projects and that on the development of the fisheries, in addition to the elaboration of a model for the Bahrain economy.

Figure 2.1 Number of Labs, Books and Periodicals and/or Journals for 1987-91



The reasons for the weaknesses in the research facilities in Bahrain are similar to those identified by Al-Mutraf (1989, p50-51) in a study on the research facilities available to members of the teaching faculties in some Saudi universities, carried out in the college of management sciences in King Saud University. His account of the

obstacles to research shows clearly the importance to the work of the research scientist of various deficiencies. These in the order of importance are:

- Centralisation of the library and its short working hours.
- Lack of recently published books and periodicals.
- Absence of automatic indexing of references and topics.
- Lack of encouragement to university professors to undertake consultation work outside the university.
- Lack of quarterly journals in which to publish research findings.
- Lack of objectivity in the decisions of some referees.
- Lack of financial incentives for technicians.

The shortage of specialisations is another problem in Bahrain. In research establishments such shortages create a lot of dissatisfaction amongst staff who are asked by management to do a certain piece of research which requires a specialisation which they lack. The research scientist or the group may, out of self-esteem, accept the work despite the lack of that specialisation which at the end will result in below-standard work and in turn backfire on the management and the organisation's reputation. Specialisation is one of the basic elements of organisational structure (Hellriegel & Slocum, 1989). Therefore important as it is to identify tasks and assign them to the appropriate research scientists, it is no less important to provide the specialist personnel in the form of consultants or scientists on loan from other research institutions inside and outside Bahrain.

One solution to the problem of a lack of specialisation in some fields is for research organisations to encourage and undertake large-scale projects which require group effort. This can be achieved by creating the right environment for the deployment of integrated team work, since there is not much scope nowadays for individual effort when it comes to applied research. All research that is carried out today in the institutes of higher education and the research centres is done on a team-work basis (Abu-Shaikha, 1986) with a group of scientists participate each making his specialised contribution, assisted by a group of research assistants and technicians, under the supervision of a senior individual.

2.7 Lack of Information

Updated information in all its forms is one of the most important tools of research. Bahraini research scientists suffer much because the libraries (see Figure 2.1), of which there are few in any case, are poorly stocked. The numbers of books they exhibit are small, they lack resources, stocks do not get replenished regularly, material is badly organised and documentation and archiving services are weak. Another problem which adds to scarcity of information is the lack of specialised journals and periodicals of high standard in the Arab world in which research scientists can publish the results of their research. Even when they exist, research scientists have to wait for a long time before their work is published, by which time it may have lost its value and possibly even be unpublishable in the light of progress made elsewhere. Abu-Shaikha (1986) mentions that despite the vastness of the Arab world it had only 32 specialised journals by 1981, compared with more than 20,000 in the United States.

This is one of the reasons why many Arab research scientists are eager to work in the States after they had finished their studies.

Unfortunately, the research published by Bahraini research scientists and scientists in the GCC generally in foreign journals and in foreign languages benefit those scientists who read them where they are published rather than in the region. There is a great need for scientific journals in the Arab world with editorial and reference boards comprising the best professors, each in his line of specialisation, which will publish original research in Arabic (Abu-Shaikha, 1986). It is rather unfortunate that there is not, in the Arab world, a list of Arabic scientific periodicals; and in any case few of those which would figure on it are issued irregularly and subject to rigorous referring.

Another problem that limits the dissemination of information in the field of research is the negative role played by the local publishers who do not publish specialised books for commercial reasons. With the result that a wealth of valuable information remains unpublished. This represents a great loss to society and research, depriving research scientists of important sources of information and ideas. Moreover, even when research scientists get the chance to have their work published by local publishers, they are often treated in such a way that they are discouraged from further publication.

The creation of national data bases or of a national information centre in Bahrain has been contemplated for some time now and many officials and research scientists have called for action. Al-Hashimi (1986), writing on the importance of reliable information in the field of management, suggests that consideration be given to setting

up a joint Management Information Centre to operate on a multi-sector basis, providing three major types of service to organisations:

1- General information covering economic, sociological, vocational and technical variables relevant to various organisations at the executive and middle management levels.

2- Specialised "functional" information covering particular spheres of management, such as human resources, marketing, production and operations, finance and accounting, and data processing/management information systems.

3- Expertise in specific problem areas custom tailored to particular organisations. This service should include a "think tank" capability.

2.8 Absence of Rewards and Incentives

Absence of rewards and incentives in organisations can seriously jeopardise work attitudes and motivation which ultimately reflect on the output of the organisation. Scientists like to have a certain degree of freedom to make decisions when doing research and even to voice criticism. The research team leader in Minist 6 explained:

> *"The management could have consulted with us. Surely we could have got them a better deal. This project can surely be done in a more effective way."*

Therefore, the management of research organisations should consider moving to a less structured organisation, demonstrating willingness to share responsibility and consult with staff. "People are better educated, want a voice in decisions that affect their jobs" (French, 1982, p6). Involving research scientists in decision-making is one of the best ways of motivating them. On this issue Schein (1984) emphasised the

importance of giving employees a voice in the making of decisions and trusting them to contribute rationally and loyally without surrounding them with elaborate control structures. When I asked research scientists in Bahrain how important rewards were to them, all agreed that intrinsic rewards were as important as extrinsic ones, if not more so (personal interviews). The sense of achievement is as important as the monetary reward. Rewards should also be commensurate with the achievements. For example some firms give special awards to scientists who make important contributions to the technology of their companies. Some give recognition to innovative scientists with no cash accompanying the recognition. Badran (1990) has observed that in the Arab countries not all scientists value the intrinsic rewards as highly as the extrinsic ones. Some scientists concentrate on the management style and systems of material rewards in the organisations they work in and on finding means of promotion. Badran argues that motives, generally, are defined by the values that prevail in the society. Those values play a big role when it comes to the evaluation of research by ordinary people and make them realise the importance of providing scientists with opportunities to work and produce and with recognition for their achievements. If these people understood the relation between research and the advancement of society they would try to provide the means needed to encourage and motivate scientists. If they fail to do so the scientists might feel a sense of alienation which could result in the loss of some very valuable assets.

On the importance of extrinsic rewards in the form of pay, Badran (1990) explains that the scientist does not mind if his reward is small. What hurts him is the feeling that some groups with less qualification and expertise in society earn more. However,

it would not seem that scientists in the Gulf States are conscious of such relative financial deprivation, as that they suffer from the lack of opportunity to practise their expertise because of weaknesses in the laboratories, for example, in some research organisations. More often than not, however, this is due to the scientists themselves seeking managerial positions with the result that they concentrate on administrative work.

In one research organisation, in Bahrain this is unfortunately the norm (personal interview). Some research scientists after obtaining their higher qualifications concentrate on administrative work with a view to rising to higher positions in the organisation and consequently in the community at the expense of research and developing their special knowledge as a valuable asset to society. In order to overcome this problem better incentive schemes should be provided and systems such as "dual ladder" be introduced, in order to fulfil the research scientist's desire for promotion which would otherwise not be possible.

2.9 Funding of Research

Unfortunately, the figures in appendix 1 for expenditure on research cannot be quoted with confidence since it was found that the people concerned did not give accurate figures in so far as they had to estimate what proportion of the total budget of an organisation was attributable to research as such. Therefore their figures were ignored. In Bahrain research funds mainly come from government and contract research. In 1985/86 the total expenditure on research (salaries excluded) according

to Alloush and Freija (1986) amounted to a meagre 400,000 Bahraini Dinars*, 0.029% of the government's budget.

There has also been poor support from the major national companies which have shown a reluctance to set up even small research cells to deal with the problems they face in their operations, as was shown by the survey carried out by Alloush and Freija (1986). These companies would rather rely on foreign research establishments and ignore local research capabilities for anything more than a small proportion of the work-this despite the huge profits they have been making. In 1991 Bahrain Petroleum Company and Bahrain National Petroleum Company made 650 million Bahraini dinars and the petrochemical industry 20 million Bahraini dinars (unpublished source).

As for the Bahraini private and semi-private commercial and investment sectors they also have not shown much interest or faith in domestic research, although they made healthy profits. In 1991, for example, Bahrain National Bank made a net profit of 10.2 m Bahraini dinars, Bahrain Telecommunication Company 24.8 m and Bahrain Hotels Company 3.8 m (BSE, 121/1993).

Al-Rumaihi and Dannish (1990, p6) suggested the following reasons for this lack of interest:

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* Bahraini Dinar = $ 2.6.

1- The lack of a clear relationship between scientific research on the one hand and the production establishments on the other.

2- Companies would like to make quick profits while research is slow to produce results.

3- Wrong ideas about research are held by those responsible for industry.

4- The majority of foreign companies exporting technology tend not to establish research units when executing production projects in the Arab countries. Moreover, they do not provide the equipment and facilities needed for carrying out research, all of which perpetuates the dependence of the countries concerned on these companies.

5- The majority of the domestic companies do not suggest setting up research units for fear that such units will require huge amounts of money to run while the research will take a long time to bear fruit.

It must be appreciated, however, that the responsibility for creating an environment which will encourage research in Bahrain does not fall on one sector of society alone; it is the responsibility of society as a whole. The funds allocated to research (Table 2.4) by the ministries and governmental institutions clearly show that research has a low priority. Table 2.4 shows that the total expenditure is less than 1% of the total governmental budget. The annual contribution from the government to the Bahrain Centre for Studies and Research, for example, has been only BD 263,000 since its inception. Table 2.4, however, shows that the budget for research by the Centre in the years 1987 and 1991 exceeded this amount by BD 453,776 and BD 604,000 respectively. These extra funds were made up by donations from various institutions and the Ministry of Development and Industry, the latter imposing a levy on oil production which contributed about 62.5% and 70% to the total donations in 1987 and 1991 respectively.

I argue that employee motivation, performance and job satisfaction are the key issues for research organisations and for that matter any organisation in Bahrain or world wide. The labour force profile is changing significantly towards a younger, better qualified work force. For instance the number of Bahrainis employed with BSc increased by 190% in the period 1981-1991 and those with higher diplomas and masters by 755% for the same period (see table 2.3).

Table 2.4 Budget for Research in the Governmental Departments and/or Institutions in Bahrain in 1987 and 1991 (in Bahraini Dinar)

Name of Institution	Budget for Research		Research Budget as % age of Total Govt. Budget for 1987 and 1991	
	1987	1991	1987 560,000,000	1991 590,000,000
Bahrain Centre for Studies & Research(1).	716,776	867,000	0.128 %	0.147 %
Bahrain University(2).	-	45,000	-	0.008 %
Research Departments within the Ministries(3).	2,961,927	3,145,946	0.529 %	0.533 %
Total	3,678,703	4,057,946	0.66 %	0.7 %

(1) The Bahrain Centre for Studies and Research Budget, the Financial Years 1987 and 1991.

(2) Telephone Interview, May, 1992.

(3) The State Budget for the Financial Year 1991, Ministry of Finance and National Economy, Bahrain, 1991.

This I believe has significant implications for staff (research scientists) management, as the "new generation" employees may have different needs and expectations to ensure their optimum contribution and long term commitment. The critical question is what is really important to the new generation of employees in terms of their job and the organisations? What are their expectations? What would it take to win their full motivation and long term commitment? I believe that there is speculation about the answers to be, but we do not have adequate insight into their real expectations. Therefore, I decided to undertake a study of a sample of research scientists in governmental research organisations with a view to study their attitudes and behaviours and hopefully find some answers to the speculation mentioned above. However, with this in mind I began asking myself are there research activities and in which organisations they are being done? How these organisations have developed? How serious the government and the society (private sector) are about research? What kind of funds are available? Are there adequate back-up facilities provided? And finally how research is organised and planned? I believe that all this can affect the attitude and behaviour of research scientists and ultimately their optimum contribution. For example in organising and planning research the type of environment they work in, does it allow them enough freedom, does it support and encourage creativity, does it encourage self-actualisation? Therefore to have a deeper insight into these issues, I included chapter 2 in which I attempted to establish the context for the present study.

2.10 Summary

In chapter 2 the development of the educational system and research in Bahrain has been reviewed and an outline provided of the labour force, economy and industry with a view to giving the reader some understanding of the background from which the infrastructure of research activities is derived, for example, the type of education, the type of qualifications (BSc, MSc, PhD etc.) and the number of the graduates over the period 1981 to 1991.

An analysis of the management of research scientists' activity in Bahrain, covering such functions as planning and organisation has been presented with a view to identifying the short comings which can affect the job attitudes and behaviour of the research scientists.

In this chapter it has been shown that the planning and organisation of research in Bahrain and the region as a whole are poor. There is a lack of communication and co-ordination among research organisations both locally and regionally. There is also a lack of technical and administrative support for research scientists and, most importantly, weak financial support for research. Local literature has emphasised the need to improve the working conditions of research scientists, for example to provide better equipped libraries and laboratories and better communication both locally and regionally. Closer co-operation in the field of research among the GCC countries has been called for to provide better opportunities for integrated, in-depth research. And the need has been stressed for an innovative climate where researchers can work freely and be able to apply their ideas to problem solving and for research work to be

co-ordinated through higher councils in order to maximise the use of human and material resources.

Chapter Three

Motivation, Job Attitudes and Behaviour of Scientists

An Overview

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Chapter Three

Motivation, Job Attitudes and Behaviour of Scientists

An Overview

3.1 Introduction

The purpose of this chapter is to examine critically the literature on theories of motivation with a view to understanding the needs that motivate employees and influence their job attitudes and consequently what gives rise to high performance. It also discusses the factors that affect the relationship between the employee and the employer, that is internal reputation. Because the factors affecting job attitudes run parallel to those claimed to be responsible for the determination of internal reputation, the concept of internal reputation helps to understand the employee/employer relationship (Jones, 1992a). And there is a very close connection between reputation and a number of factors that affect job attitudes: innovatory climate, job satisfaction and working conditions.

It is important to study job attitudes concerned with satisfaction and need because of their relationship to the employee's desire or willingness to come to work and to perform his/her job. It is because the study of attitudes is so closely tied to the study of motivation that one can build a model of the relationship between job attitudes concerning needs, values and satisfactions (Porter and Lawler, 1968) and job performance. Because human needs are very much a personal matter, organisations can do little to change the fundamental on-the-job needs and goals of their employees.

They can, however, influence how well motivated employees perform their jobs (Lawler, 1977). So at this point, it is pertinent to review those aspects of motivation theories that appear to be particularly relevant to an understanding of the relationship between job attitudes and job performance.

First, in order to understand the needs of research scientists, the literature related to the understanding of the nature of R&D activity will be reviewed. In the following section several classifications of R&D are outlined. The subsequent section will elaborate more on R&D's growing role as a development tool in many countries. The third section identifies the problems associated with the management of scientists with a view to identifying the factors that could affect their attitudes towards their work. The fourth section is concerned with the motivation, job attitudes and behaviour of research scientists. Some definitions of motivation from the relevant literature will be presented. The various approaches to motivation together with some of the content and process theories of motivation will be discussed as well given their importance in the explanation of behaviour. Next, some definitions of job attitudes will be presented and this will be followed by a discussion of the factors affecting job attitude and behaviour.

Section five of the chapter concentrates on the concept of internal reputation with particular reference to research scientists. It reviews the development of the concept of the relationship between employer and the employee or the internal reputation of the work-place. Factors that can affect reputation will be presented here. In section six, since UK and Bahrain scientists' perceptions of their work-place i.e. internal

reputation will be compared, the literature on the effect of culture on the attitude and behaviour of employees will be examined.

3.2 Research and Development: Definition and Classification

Emory (1985, p16) defined research as "any organised inquiry carried out to provide information for solving problems." He (p8) also quotes Kerlinger (1973) as defining scientific research as a "systematic, controlled, empirical, and critical investigation of hypothetical propositions about the presumed relations among natural phenomena". Roussel et al (1991, p14) define research in the following manner: "To the academician and those who work in research institutes, research means an orderly approach to the revelation of new knowledge about the universe. The objective of research is to advance knowledge and understanding, and the boundaries of the search are limitless." There are different ways to classify the types of research, one of these being to base the classification on the organisation involved (Dumbleton, 1986). This would give a classification into academic research, government research, independent research and industrial research (R&D). Basic academic research has traditionally been associated with universities from the early days of their existence, developing first in the natural sciences and later in the social sciences. But this has changed and now many universities around the world, especially in the developed industrial countries, are engaged in applied research and many industrial units are involved in basic research in order to expand knowledge which might be needed in future for the development of a new product or process (Dickinson, 1986).

As for R&D there are several classifications. One is from the Organisation for Economic Co-operation and Development (OECD) report, quoted by Freeman (1974) (Dumbelton, 1986, p8), on "The Measurement of Scientific and Technical Activities". In the OECD classification three categories of R&D are distinguished: basic research, applied research and experimental development:

(i) Basic research is original investigation undertaken in order to gain new scientific knowledge and understanding. It is not primarily directed towards any specific practical aim or application. However, in oriented basic research the investigator is directed towards a specific field by the employing organisation.

(ii) Applied research in R&D is the original investigation undertaken in order to gain new scientific or technical knowledge. It is directed towards a specific practical aim or objective.

(iii) Experimental development is the use of scientific knowledge in order to produce new or substantially improved materials, devices, products, processes, systems or services.

Another useful classification which more clearly illustrates the role of industrial R&D is derived from the relationship between the research component (R) and the development component (D) of this activity. Roussel et al (1991) define three basic types of R&D:

(i) Incremental
(ii) Radical
(iii) Fundamental

In the first type the relationship is such that the 'r' is small and the 'D' is big. The goal of the incremental R&D is small advances in technology, typically based on an established foundation of scientific and engineering knowledge. This type relies on

clever application of the existing knowledge to achieve a goal such as reducing manufacturing costs through small but important advances such as energy conservation or the use of computer controls, for example 'Raizen' in Japanese companies. Although these incremental advances are small when considered separately, the end result can produce meaningful savings. Small, incremental technical steps yield large strategic results.

In the second type, radical R&D, there is a large 'R' and often a large 'D'. This type draws on a foundation of existing scientific and engineering knowledge that is insufficient alone to arrive at the desired practical result. The goal is to discover new knowledge which might be put to useful application. In this type of research the risk is not always severe since such projects begin as exploratory investigations or feasibility studies, intended to test the basic concepts on which the project will rest. This phase is low cost since it involves few research scientists compared with the development phase. However, the decision to enter the later phase can be helped immensely by successful research which will have reduced uncertainty to levels acceptable to the business.

In fundamental R&D, the relationship between the research and development is such that the research component is large, 'R', and the development component, 'D', is non-existent. Roussel et al (1991) describes this type as, "fundamental R&D is a scientific/technological reach into the unknown." However, fundamental R&D seems to be the most difficult area for the management to make decisions about. This is due to the elements of uncertainty inherent in this type of research such as scientific,

competitive, social and governmental, which may change over the period (5 to 10 years) before the fruits of such research appears. In addition to this, there is the problem of keeping the research scientists motivated and performing to a high standard in order to ensure the creativity and innovativeness so important in R&D. This type of R&D prevails in the GCC countries where support for research activities is not commensurate with the scientists' desires to research various problems.

Table 3.1 Expenditure on R&D as % of GNP in G7 & Some Developing Countries

Country	% of GNP	
	1987	1991
United Kingdom	2.3	2.1
United States	2.9	2.9
Germany	2.9	2.8
Japan	2.8	3.0
Canada	1.4	1.6
Italy	1.2	1.3
France	2.3	2.4
S. Korea	1.9	2.1
Egypt	0.6	1.0
India	0.9	0.8

It is accepted that one of the most crucial indicators for an effective and efficient R&D policy is the national commitment to finance such activities. Table 3.1 gives a comparison on the expenditure on R&D in the seven leading industrial countries and some developing countries in the period 1987-1991 as a percentage of gross national product. It is clear from table 3.1 that expenditure on R&D activities in the G7 countries was on the increase in the five years from 1987 to 1991 with the exception

of the UK and Germany where there was a slight drop in expenditure. In some of the developing countries too there was an increase, e g 11% in South Korea and 67% in Egypt while in case of India there was a slight drop. But the expenditure of both Egypt and India was below the 1% threshold for effective R&D (UNESCO Science & Technology Report, 1996).

In the Arab countries the level of R&D expenditure is on the whole much lower than the minimum level for carrying out meaningful research. The average ratios of R&D expenditure to GNP in the Arab states was only 0.3% (UNESCO Annual Report, 1995). In GCC countries the average expenditure on R&D was a meagre 0.06 percent of GDP (GNP ratio not available) in the period 1988/1990, mainly governmental expenditure. In Bahrain the total expenditure as a percentage of the government budget in 1987 was 0.66% which slightly increased to 0.7% in 1991 (see table 2.4, chapter 2). It must be noted, however, that statistics regarding expenditure on R&D in the GCC countries are considered confidential and are incomplete and rather erratic.

As regards the classification of R&D activities, it is hoped that greater understanding of the nature of the work involved will lead to the factors that affect the attitude and behaviour of research scientists towards their organisation being identified. For example in the fundamental type of R&D (Roussel et. al., 1991) where the results, as pointed out above, take time to emerge, it is difficult to maintain a high level of motivation among researchers. Therefore, the management needs to provide the type of climate in which researchers will continue to work effectively and which will

provide work enrichment to compensate for the set-backs inherent in this type of research.

3.3 Problems With Management of Scientists

Difficulties in managing professionals and scientists as a group stem from such things as are suggested by Raelin (1991), namely a natural conflict between management and professionals because of differences in educational background, socialisation, values, vocational interests, work habits, and outlook. Perhaps one of the most difficult aspects of the management of research is the effective management of the personnel engaged in it. Sapienza (1995) attributes the difficulty of managing scientists to the challenge of leading people whose primary activity occurs between their ears. Moreover, the purpose of that activity is to generate knowledge and ideas, an endeavour that, in comparison with other organised activities, is oblique, hard to predict, unwieldy to measure and difficult to judge except in hindsight. She argues that because of these characteristics much of the conventional wisdom on administration, such as engineering - based planning and controlling, may not be directly applicable to R&D. Another difficulty she outlines stems from scientific education and training that produce groups of people who have conceptual frameworks, vocabularies, and discipline cultures that are very different from one another. Sapienza (1995) sums up the difficulty in managing scientists by saying that achieving the right balance in R&D between, first, the ambiguity and challenge necessary to foster creativity and, secondly, the constraints necessary for producing results within time and cost limits and perhaps commercial objectives, is fraught with problems.

In developing countries R&D activities are relatively new and less well supported than in the industrialised countries. For example expenditure on R&D in the UK in 1991 was 2.1% of GNP while in India and Egypt it was only 0.8% and 1.0% of GNP respectively (Table 3.1). The problems associated with organising research and managing the researchers in these countries are even greater. Black (1980) relates the weaknesses of science and technology organisations in developing countries to the difficulties of managing these organisations, while making clear that these difficulties are not confined to the developing countries. Black (1980, p75) gives the following reasons:

1- Many, if not most, of the R&D institutes' projects and activities are non-repetitive.

2- Because of unknowns in research, engineering, and environmental response factors, uncertainty is greater concerning the outcome of projects of R&D institutes than is the case with most other types of organisation.

3- The product of an R&D institute is largely intellectual not physical. Thus, similar arrangements of factor inputs in R&D will not necessarily give the same results. This compounds the uncertainty associated with the management of R&D institutions.

4- The staff of R&D organisations tend to be creative and individualistic. The productive management of such people calls for imagination and flexibility beyond that called for in the management of many other kinds of organisation.

Research planning is a major problem for managers of research organisations, especially in developing countries where the emphasis is on researching projects which can help their development plans. A balance has to be struck between the general research policies of the state and the interests of the research scientists. Failure in this can lead to dissatisfaction which in turn can jeopardise the effectiveness and efficiency of research. Andrews (1979, p167) refers to the problems of research

planning in a study on Hungary which concludes that the majority of researchers still seemed to show some scepticism toward planning. They felt that their own freedom suffered if they had to subject their conceptions to a planned research project. A main weakness of the research planning system in Hungary was the establishment of unsuitable reporting practices; that is, the control exercised by the co-ordination councils was not sufficient, and consequently the number of research projects per researcher might be too high. In addition, certain themes might be dealt with by research institutions separately and in parallel without any co-operation. This meant that the researchers' individual interests and their ambitions for their own careers might come into conflict with the interests of society and the economy. The researcher might not be concerned about the rapid completion of the work, and the research plan might not motivate him either. The basic elements of planning that might enhance the effectiveness and efficiency of research, as Andrews (1979, p167) outlined them, are:

1- Researchers being free to look for projects and methods.

2- Management being flexible.

3- Research freedom being not absolute but research projects having to be adjusted to a research plan that serves the interests of the economy.

4- The researchers being independent to a certain extent but responsible for their activity.

The problems associated with poor planning of research in developing countries is that either it is lacking or carried out haphazardly. Formulating research problems which are oriented to practical applications is a serious problem (Putti, 1986). In

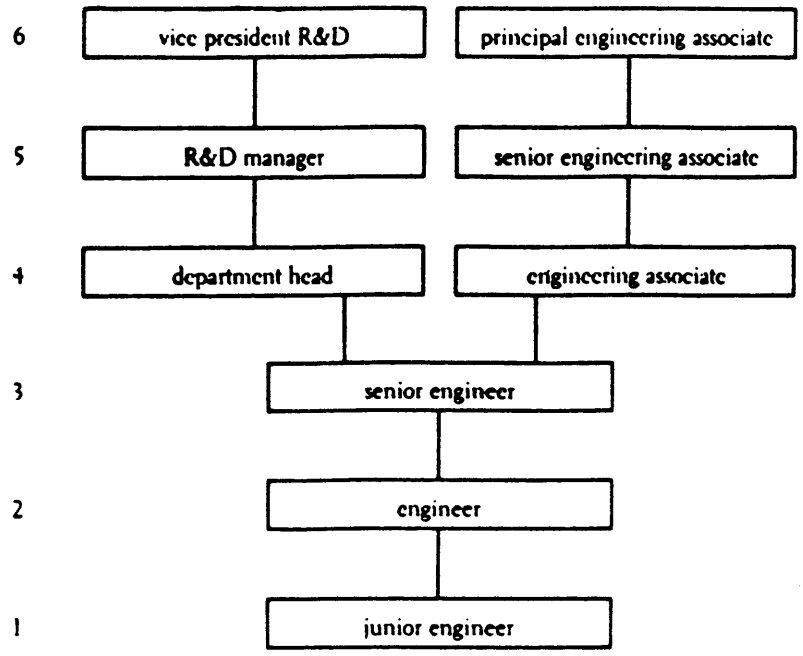
developing countries, the problem is how to prioritise research work and to establish criteria for selecting among the large-scale research programs proposed by the operational units. Co-ordinating the strategic and tactical planning is also a problem.

Organising scientists in institutions and laboratories is not an easy task given the inherent nature of research and the characteristics of scientists. This is so because the means of production in research is the creativity of individuals (Burns, 1988). Porter (1985) suggests that a skilled and committed work force is crucial for the survival of individual firms and for successful national economic development. Keller and Holland (1979, p90) state that, "R&D managers are usually faced with difficult selection decisions when professional employees are involved ... because of the complex and often unpredictable nature of R&D work as well as the lack of clear-cut standards by which to measure performance."

French (1982) reports on a study (for which no statistics are provided) that most scientists believe their skills are not being fully utilised. When questioned about the percentage of time spent in different kinds of activities, the average scientist reported that about two-thirds of his or her time was spent on routine work not requiring a professional-technical background. This reinforces the importance of job design and redesign and job enrichment in research situations, because research scientists are the type of people who want to do challenging work and apply the tools they have acquired effectively.

On the importance of job design as a motivational tool and a factor in job satisfaction, Mullins (1989) states that the nature of the work organisation and the design of jobs can have a significant effect on the job satisfaction of staff and on the level of organisational performance. Redesigning jobs to bring about higher levels of employee motivation is an important management strategy which can produce valuable results and make life more satisfying (Robertson, 1992). Job enrichment answers the absolute need of professionals for challenge by allowing them to use their skills fully. It allows them to stretch their intellectual abilities to the limit, to be involved in their work, to identify with what they are working on, and to see their contribution (Raelin, 1991). Scientists are usually attracted by the nature of the work itself, the freedom to pursue their own research interests, and the people with whom they associate (Miller, 1986). Scientists need autonomy, discretion, and participation in professionally based organisational activities (Raelin, 1991). It is unique in providing a way for the professional to advance without having to adopt a non-professional career track. Through the dual ladder (French, 1982, p409) the professional employee can be advanced to such positions as "senior research scientist" as well as to more managerial positions such as "director of inorganic research". The dual ladder as an approach has been in use for over thirty five years. It consists of the usual managerial ladder of hierarchical positions leading to increased managerial authority and another ladder of professional positions that carries comparable prestige in terms of salary, status, autonomy and responsibility. The chart (Raelin, 1991, p186) shows a prototypical dual ladder format for a general engineering career path. Raelin (1991) reports that the dual ladder was introduced as an answer to the dilemma of professionals who wanted to advance in their careers without becoming managers.

Figure 3.1 Prototypical Dual Ladder For Engineering



Managers should organise research scientists' work in such a way as to help them build pride in their work and encourage them to map their own plans rather than rely wholly on management to provide them. Pelz and Andrews (1976, p110) advise research directors and managers to apply practical measures, some of which are listed below, in order to encourage the self-reliance and independence which is vital in research organisations:

- Make sure the individual has a chance two or three times a year to tell a gathering of colleagues what he is up to, where he has come from, and where he plans to go. Let him meet face-to-face with higher executives or research users who can point out the mountains that need to be climbed and then turn him loose to climb. In meetings to review progress on designs, let the engineer who did the work explain it, not the section head.

- If the individual has no recent report or paper or patent in which he can take pride of authorship, prod him to produce one every so often that bears his name (with not more than one or two co-authors). Then see that the contribution is featured in the company newsletter or, even better, in newspapers and trade journals.

- If output takes the form of designs rather than of papers or reports, let these be signed by the actual designers. If necessary, identify the sub-parts which each individual has contributed.

- Where letters or memos are handled by an individual, let him sign them personally (the boss can co-sign if necessary).

- Base monetary and status rewards not just on supervisor's judgements, but give weight to evaluations by colleagues of work accomplished. Let individuals demonstrate claims to respect by reports, papers, or designs they have authored, or by presentations at colleague seminars.

Finally, incentives are as important for research scientists as they are for any other type of employee, although, perhaps, the motivational needs of this group of professionals differ somewhat from the ordinary in that the intrinsic rewards are of equal if not greater importance than the extrinsic ones.

Miller (1986) points out the importance of Quality of Professional Life (QPL) in the retention and motivation of scientists, which is based on the Quality of Working Life (QWL). The best fit between individual and work occurs when the organisation provides 'psychic income'. The idea of psychic income is derived from the work of Hackman and Shuttle (1977) who indicate the need for work to provide high 'internal' rewards; employees must receive 'feedback' from their work, they must have personal responsibility for the tasks they perform, and they must care about their work. This will ease the problem of control which is one of the most difficult and challenging for research managers. Progress is difficult to measure and together with quality has to

be evaluated subjectively by other scientists and reported to the managers. It is not easy to evaluate research programme quantitatively and as Burns (1988, p69) states: "Research evaluation remains an area where a formula is not a substitute for experience, vision, and good luck." Pelz and Andrews (1976, p214) found in their study on the extent to which autonomy is supportive of high scientific performance in a tight or loose situation, that:

(a) the looser the situation, the more high levels of motivation (both internal and external in source) were associated with high performance.

(b) the individual's autonomy and influence were most effective in situations of only moderate looseness.

(c) that maximum autonomy in a very loose setting might isolate the individual from stimulation.

Strength of self-motivation is correlated more positively with performance ratings in the looser departments than in the tighter ones. When the situation had little structure, stronger internal motivation was needed for achievement (Pelz, 1962; Pelz and Andrews, 1976).

Another thing which can give rise to problems in the management of research scientists is the expectations they have of their jobs, including the freedom to publish and the need for technically trained management. And some typical complaints, summed up by French (1982, p405) with reference to Imberman (1976), can lead to serious control problems in research organisations:

(i) Resentment of authority exercised by people who show little appreciation for professional standards;

(ii) Feeling of frustration over not being able to attend professional meetings or engage in free discussion of scientific matters;

(iii) Frustration over lack of opportunity for advancement;

(iv) Inadequate salary differentials between them and production or paraprofessional employees.

An effective means of control in research organisations is reflected in the following quotation, from Drucker (1977, p153): "Top management in the research laboratory can and should demand the discipline of thinking through objectives, setting goals and priorities, measuring performance, and sloughing off the unproductive. This is the only way to make the research laboratory productive and responsive to the company's needs." Also, the supervision of research scientists which creates friction can be minimised by adopting mature styles of management reflecting trust and responsibility. One of these styles is management by objectives (MBO) which consists in having professionals decide with their managers what the objectives for their jobs are, how long it will take to meet the objectives, and what criteria should be used in evaluating progress toward or achievement of the objectives. By its very nature, then, MBO is mutual in its purpose and process and operates on a foundation of trust. MBO calls for advice and review from the manager but in a way that avoids the necessity for close supervision (Raelin, 1991). Another means of reducing or even waiving close supervision is by using appropriate peer evaluation, taking into consideration specialisation and unbiased opinions. Raelin (1991) on the supervising

of professionals adds: "Close supervision can also be waived where there is sufficient peer control to evaluate the quantity and quality of the professional's output".

Managers in research organisations should encourage their staff to come forward with new ideas and suggestions and follow them up where possible to successful completion. This can lead to satisfaction and hence ease the problems of control. In this respect, Bridges (1993, p347) suggests that "feedback and continual follow-ups should be performed for the approved suggestion. After all, what good is approving ideas and not using them? This lowers morale among the suggesters. There have been hundreds of studies conducted since the early 1940s that show that no brainstorming, quality circle, suggestion can survive very long without some type of recognition".

Managerial control of research scientists can be made easier and more acceptable if scientists participate in determining the policies and methods used in the organisation. People become more contented and committed to a goal when they are involved in decisions that affect them. For example Raelin (1991, p198) says: "Organisationally, it is more commonly translated as a belief that management holds no monopoly on good ideas; hence, productivity benefits if employees are allowed to suggest ways to improve their jobs in particular and the organisation in general". He continues: "The style of participative management is at its best when the supervisor can draw out the best in his people, allow decisions to be made at the point of influence and contribution, and create a spirit that everyone is in it together and that if something is unknown, they will learn it together".

3.4 Motivation, Job Attitude and Behaviour of Research Scientists

In the following section, I first examine the literature on motivation, job attitude and behaviour in general. Secondly, I look at these in relation to scientists to see if there are any differences which can affect their attitudes towards their place of work i.e. their relationship with their employers.

3.4.1 Motivation

Motivation is concerned with why people behave in a certain manner. Generally, motivation can be described as the direction and persistence of action i.e. why people choose a particular course of action in preference to others and why they continue with the chosen action often over a long period, and in the face of difficulties and problems (Krech, et al, 1962). In a review of motivation theory Mitchell (1982, p81-2) identifies four common characteristics which underlie the definition of motivation.

- Motivation is typified as an individual phenomenon in that every person is unique.

- Motivation is described, usually, as intentional. It is assumed to be under the worker's control, and behaviours that are influenced by motivation, such as effort expended, are seen as choices of action.

- Motivation is multifaceted. The two factors of greatest importance are: (i) What gets people activated (arousal); and (ii) the force of an individual to engage in desired behaviour (direction or choice of behaviour).

- The purpose of motivational theories is to predict behaviour. Motivation is not the behaviour itself, and it is not performance. Motivation concerns action, and the internal and external forces which influence a person's choice of action.

On the basis of these characteristics Mitchell (1982) defines motivation as the degree to which an individual wants and chooses to engage in certain specified behaviours. Huse (1982) defines motivation as the conditions responsible for variation in the intensity, quality, and direction of ongoing behaviour. Torington and Hall (1991, p422) offer their definition of motivation: "Motivation is a psychological concept related to the strength and direction of behaviour." Herzberg (1987) comments that the psychology of motivation is tremendously complex, and what has been unravelled with any degree of assurance is a small part of the whole. Porter and Lawler (1968, p7) quote a definition of motivation theory by Jones (1959): "Motivation theory attempts to explain how behaviour gets started, is energised, is sustained, is directed, is stopped, and what kind of subjective reaction is present in the organism while all this is going on". The obvious concern of motivation theory with the subjective reactions of the organism means that it must deal with attitude variables, and its emphasis on behaviour opens up the entire question of the relationship between attitudes and behaviour.

Managers have to understand the motivational needs of their team members, first, by carrying out regular appraisals and career discussions with staff so that career stages and motivational needs are understood by both employee and manager and, secondly, by establishing a working environment in which employees can achieve their preferred motivators and rewards (Tampeo, 1993). Staff must believe that their performance will result in the rewards they seek. This means that the work environment must not only offer these rewards but facilitate their achievement.

In research organisations motivation of research scientists is not straightforward. The difficulty stems from the problems presented by the unique nature of technical-professional jobs. French (1982) put this very clearly when he compared technical-professional jobs with other types of jobs pointing out that responsibilities and standards of performance relating to engineering and scientific positions are less readily established, performance is less readily measured, relative job worth not so easily determined, and a rationale for promotion not so easily developed. These and other complexities of technical-professional activity mean that personnel devices, systems, and policies used elsewhere within a given organisation may not be entirely applicable to the management of this group.

Roussel et al (1991, p34) summarises questions that managers of R&D ask relating to motivation of R&D people. These are listed below to show the scope of the dilemma:

- Should rewards go to individuals or to teams?

- Should the reward be immediate or deferred?

- Should the reward be public recognition, money, or both?

- Should bonuses be part of the R&D compensation package?

- Should R&D personnel be given a share of royalties or earnings?

- How liberal should a company be about permitting technical publication by those on the staff to whom publication is important?

- Should recognition of superior performance be through promotion within the R&D hierarchy, or might other mechanisms-such as freedom to choose assignment be more effective?

Although Roussel et al (1991) emphasise the importance of recognising contributions and achievements of people in R&D, they also stress that providing "a multiplicity of motivating rewards" is not enough to get the most out of the people working in R&D. They advise managers to consider the "people element" of the R&D effort in order to make it more effective. This is summed up very concisely in the following quotation: "One of the foremost tasks of third-generation R&D management is to integrate the people of R&D into the larger corporate culture, to absorb R&D into full partnership with the business and the corporation" (Roussel et al, 1991, p163).

The dilemma of motivating research scientists is also stressed by Pelz and Andrews (1976). How can research managers deal with creative people? How can they reward them? They suggest that research managers should look at their reward system in their labs, and find means of rewarding creative research scientists in the same way as they reward productive ones who produce along well-established paths, before the former become disappointed and do less well. Ford and Kleiner (1987, p49) illustrate this point in the case of management of engineers: "In the case of engineers, however, the methods that work in production, marketing, or finance will not usually work. It even takes a certain type of personality to effectively control and manage an ego-oriented group of engineers." Ford and Kleiner also say, in describing what is important for the engineers: "Far more important elements in engineers' environment are those factors that encourage learning, inquiring and discovery .... Engineers frequently cite the need for interesting and challenging work. This type of work seems to fulfil various professional needs that are oriented towards intrinsic motivation of the individual".

More importantly, research has suggested that there may be a relation between motivation and performance of research units (Andrews, 1979). The importance of motivation is stated clearly by Manners, Jr. et al (1983) and they point out that research managers list "motivation" as the most perplexing requirement of the managerial role. "Motivation is one of the most critical ingredients in work performance as well as the most difficult to understand." Perhaps what makes motivation "perplexing" and a "critical" ingredient is that the research scientists to be motivated are individuals with different needs (French, 1982; Raelin, 1991; Sapienza, 1995). Sapienza (1995) in the context of motivating R&D scientists emphasises that in an organisation where the basic conditions of work are good, the R&D manager should work hard to ensure that the human aspects of the job and of the person are matched. People's deeper needs for power, for achievement and for affiliation should be met.

3.4.1.1 Approaches to Motivation

There are several approaches to motivation, each with its own emphasis and implications. But, although there are differences, there is also a significant amount of common ground and it is possible to draw out several common practical guidelines.

Mullins (1989) has classified the approaches into four categories. These are the rational-economic concept of motivation, the social concept, self-actualisation and the complex-person concept. The first concept was advanced by earlier writers such as Taylor (1947), who believed in economic needs as the source of motivation. Workers were motivated by obtaining the highest possible wages through working in the most

efficient and productive way. The second concept was developed by human relations writers such as Mayo (1933) who made a real contribution to theory through conducting the Hawthorne studies. He discovered that the relationship between workers and their supervisors exercises a more potent influence on output than any manipulation of environmental conditions. The third concept stemmed from the work of the neo-human relations writers who focused on the content and meaning of the work and attempts to make work more intrinsically satisfying. The major contributors to the neo-human relations approach are Maslow (1943), who put forward a theoretical framework of individual personality development and motivation based on a hierarchy of human needs; Herzberg (1959), who isolated two different sets of factors affecting motivation and satisfaction at work; McGregor (1960), who argued that the style of management adopted is a function of the managers' attitudes towards human nature and behaviour at work; Likert (1961), whose work included research into different systems of management; and Argyris (1960), who considered the effects of the formal organisation on the individual and his psychological growth in the process of self-actualisation. However, the human relations approaches have been criticised because of their focus on generalised theories of good management, group psychology, and the suggestion that there are needs common to all individuals at work (Mullins, 1989, p47). The fourth concept of motivation is based on the contingency approach to organisations and management, which takes the view that there is no one 'best' structure and that there are a large number of variables, or situational factors, which influence organisational design and performance. The varying situational factors together with the complicated nature of human behaviour lead to the complex-

person concept of motivation. Contributors to the contingency approach were Woodward (1980), Burns and Stalker (1961), and Lawrence and Lorsch (1969).

Another useful contribution is that of Hellriegel and Slocum (1989) who classified the approaches to motivation clearly and in a practical, orderly form that leads to greater understanding. They identify two broad approaches to motivation: first, content, which emphasises the needs that motivate people. These needs translate into internal drives that give rise to specific behaviour intended to fulfil these needs. For example Maslow's (1954) needs-hierarchy theory and Herzberg's (1959) motivation-hygiene theory are content theories.

Hellriegel's and Slocum's second category are process approaches, which explain how employees select behaviours to meet their needs and how they determine whether their choices were successful. They suggest that Vroom's (1964) expectancy theory and that of Porter and Lawler (1968) are process theories; and they take the view that expectancy theory can be used to explore managers' understanding of why workers behave as they do. Huse (1982) defines the content theories of motivation as those that provide some idea of the needs people try to satisfy, although they do not show how people attempt to satisfy those needs at work or how managers can change the work situation to enable employees to satisfy their needs through improved job performance. He maintains that the process theories of motivation are more useful in these areas.

O'Reilly (1991), discussing new approaches to motivation, recalls that Hyland (1988) proposed a control-theory framework in an effort to integrate early motivational theories. In the latter's view, behaviour is explained in terms of variation in either the amount of energy invested in a specific goal, the goal itself, or the organisation of the goal. This approach, as reported by O'Reilly, is ambitious but lacks empirical support. Also, he reports on novel approaches to motivation where use is made of scripts as determinants of behaviour (Lord & Kernan, 1987) and where there is a focus on the role of language (Sullivan, 1988). These theories, however, are less frequently used, as O'Reilly (1991) reports, and the bulk of the empirical research into organisational behaviour continues to focus on two dominant theories: goal setting and equity. A resurgence of interest in intrinsic motivation has occurred primarily in social psychology. Pritchard et al (1988) report on how feedback, goal setting, and incentives affected group productivity, O'Reilly (1991) reports that group-level feedback increased productivity by an average of 50% over base line, group goal setting increased it by another 25%, and incentives increased it still further. On the general validity of equity theory, O'Reilly reports as an example that the field experiment by Greenberg (1988) involving the relocation of an insurance office found that workers reassigned to higher status offices raised their performance while those reassigned to lower-status offices lowered their performance levels, both results being consistent with equity theory.

3.4.1.2 Theories of Motivation

The main purpose of theories of motivation is to predict behaviour. However, there are many competing theories which attempt to explain the nature of motivation and

they all help to explain the behaviour of certain people at certain times (Mullins, 1989, p302). The search for a generalised theory of motivation at work appears a vain quest. Nevertheless, in this section the most common theories of motivation will be outlined and discussed with a view to identifying the factors that affect the behaviour of research scientists and can assist in the understanding of their attitudes to their work. As French (1982) says, what motivates employees and what organisations can do to enhance motivation are complex matters. There are numerous theories of motivation from which managers can pick and choose. All of these theories have had their critics and no one theory provides an adequate prediction of behaviour in all circumstances.

Maslow (1954) focuses on the understanding of basic human needs such as food and water, safety needs such as the need for protection against danger, belonging and love needs such as giving and receiving friendship and love, esteem needs, both self esteem and esteem from others and self-actualisation needs such as realising own's potential. In his theory Maslow assumes that the physiological needs are dominant and all other needs stem from them, and that these needs have to be satisfied before higher needs emerge. It is this assumption that gives the theory its hierarchical aspect. As Maslow (1954, p83) himself puts it: "Basic human needs are organised into a hierarchy of relative prepotency". Another assumption is that needs assume sequential strength and decline in the hierarchy. So when a lower need is satisfied it becomes less strong and ceases to control behaviour and gives way to the next in the hierarchy of needs, suggesting that when a need is satisfied it is no longer a motivator. This is illustrated in Maslow's statement: "But a want that is satisfied is no longer a want. The organism is dominated and its behaviour organised only by unsatisfied

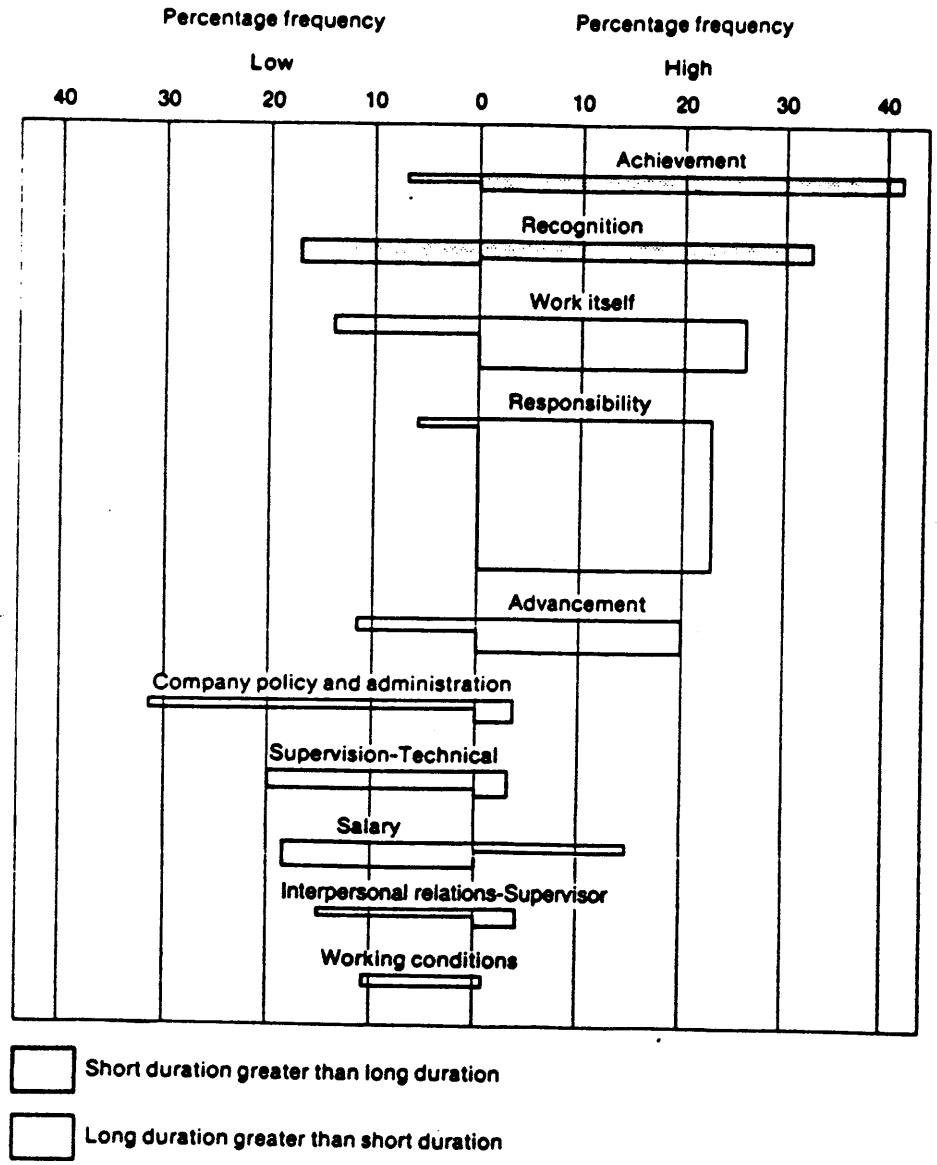
needs" (p84). However, this is, as understood by Maslow, the case with lower needs in the hierarchy such as the physiological needs. The higher needs, once to some extent satisfied, grow stronger: one of these is the need for self-actualisation or self fulfilment, put by Maslow as "the desire to become more and more what one is, to become everything that one is capable of becoming" (p92). In summary, Maslow's need-hierarchy theory exhibits two aspects: one is developmental, in that, within the hierarchy of five needs categorised by Maslow the higher needs such as self-esteem and self-actualisation develop when lower needs such as physiological needs have been fulfilled. Secondly, lower needs decline in potency once they are satisfied and higher needs grow in potency as they are fulfilled. Alderfer (1969) developed an extension of Maslow's theory. His theory is based on a three-fold conceptualisation of human needs: existence, relatedness, and growth (ERG). ERG theory was tested by means of a questionnaire sent to 110 employees at several levels in a bank. The results tended to support ERG theory rather than Maslow's theory. Herzberg et al (1993, p110) commented on Maslow's theory: "As concept of Maslow's system has been extended to the problems of job motivation, the basic biological motivations are generally found to be at a sufficient level of satisfaction so that the hierarchy lies within the various psychological and social needs of the individual. This concept has led many people to feel that the worker can never be satisfied with his job. How are you going to solve the dilemma of trying to motivate workers who have a continuously revolving set of needs?"

Herzberg et al (1959) developed a motivation-hygiene theory of job attitudes, defined as the objective elements of the situation in which a person finds a source for his good

or bad feelings about his job. These factors are: achievement, recognition, work itself, responsibility, advancement, salary, supervision, interpersonal relations, physical working conditions, company policies and administrative practices, benefits, status and job security. Herzberg et al tested their theory by interviewing approximately 200 engineers and accountants working in industry in Pittsburgh (1993, p57). Their concern was mainly whether different kinds of factors were responsible for bringing job satisfaction and job dissatisfaction, and whether general psychological principles could be found to account for the differences. They asked the respondents when they felt exceptionally good or bad about their jobs. The authors collected experiences, judgements and observations by using sampling, directed observations and detailed reports. The data in each case included not only the specific attitudes in the job situation but the factors associated with these attitudes and also the effects of the job attitudes on work performance. Content analysis was applied to the specific stories and periods of either high or low morale.

Herzberg et al's basic finding was that factors are not equally likely to produce a high or low attitude; but if an attitude is produced by any factor it is just as likely to have an effect as an attitude caused by any other factor. Another finding was that job attitudes are a powerful force and are functionally related to the productivity, stability, and adjustment of the industrial working force. And the differences, as figure 3.2 shows, between satisfiers and dissatisfiers involve not only a qualitative difference in the factors but a difference, largely quantitative, in effects. Specifically, the positive effects of high attitudes are more potent than the negative effects of low attitudes.

Figure 3.2 Comparison of satisfiers and dissatisfiers



Herzberg et al concluded that the factors act in the context of the job should be called hygiene factors as they act in a manner analogous to the principles of medical hygiene. The absence of these factors serves to bring about poor job attitudes and an improvement in these factors serves to remove the impediments to positive job attitudes. Among the factors of hygiene the authors include supervision, interpersonal

relations, physical working condition, salary, company policies and administrative practices, benefits, and job security. When these factors deteriorate to a level below what the employee considers acceptable, then job dissatisfaction ensues. However, the reverse does not hold true. When the job context can be characterised as optimal, this certainly does not lead to job dissatisfaction, but neither does it lead to very positive attitudes. The factors that lead to positive job attitudes are called by Herzberg et al "motivators", because they satisfy the individual's need for self-actualisation in his work. Among motivators were included: recognition, achievement, interesting work, responsibility, and advancement. However, the absence of these factors does not lead to job dissatisfaction. Herzberg et al concluded: "It should be understood that both kinds of factors meet the needs of the employee; but it is primarily the motivators that serve to bring about the kind of job satisfaction and job attitudes".

Herzberg (1993, pxv-xvi) in his new introduction to his theory has shed more light on the application of motivators. Some of the additional points are quoted below:

- It became evident that a big sub-category in the work itself had been missing from most of our previous studies: the client relationship, often the most frequent source of motivation and job satisfaction with the work itself in service jobs and in well-designed manufacturing jobs.

- Responsibility had to be translated into more specific terms in order to be implemented: (a) self-scheduling, to fit the client's needs rather than the supervisor's needs for simplified checking procedures; (b) authority to communicate with the client and with others necessary to do the job without long, time-consuming digressions through the hierarchy; (c) control of resources, mini-budgets, tools, etc. necessary to do the job; (d) accountability, signing correspondence, computer entries, etc. so as to be identifiable to the client and others.

- The term hygiene, which I chose for the environmental factors, has not been a popular one.

The theory, like many in the field of organisational behaviour and attitudes, has been heavily criticised and alternative and sometimes contradictory explanations have been put forward. For example Beach (1980) quotes Vroom's (1964) comment that employees who were interviewed in Herzberg's study tended to attribute their satisfaction to their own achievements on the job while ascribing their dissatisfaction, not to their own inadequacies, but to factors in the work environment (hygienic factors). And Evans (1991) summarised the comments of House and Wigdor on Herzberg in three points: 1- a given factor can cause job satisfaction for one person, and not for another, for example age, sex, job; 2- a given factor can be a source of both satisfaction and dissatisfaction in the same group; 3- achievement and recognition (or their absence) are just as much causes of dissatisfaction as satisfaction, therefore the division between job satisfaction and job dissatisfaction does not really exist.

Locke (1973) reports in his study on how two "accidental" samples of white- and blue-collar employees described satisfying and dissatisfying job incidents. These incidents were categorised using a new (event-agent) classification system developed by Schneider and Locke to overcome certain limitations in Herzberg's method. It was found that the same categories of events caused both satisfaction and dissatisfaction within each job level. A number of researchers have been unable to provide empirical support for the major tenets of the two-factor theory itself. It appears that the original

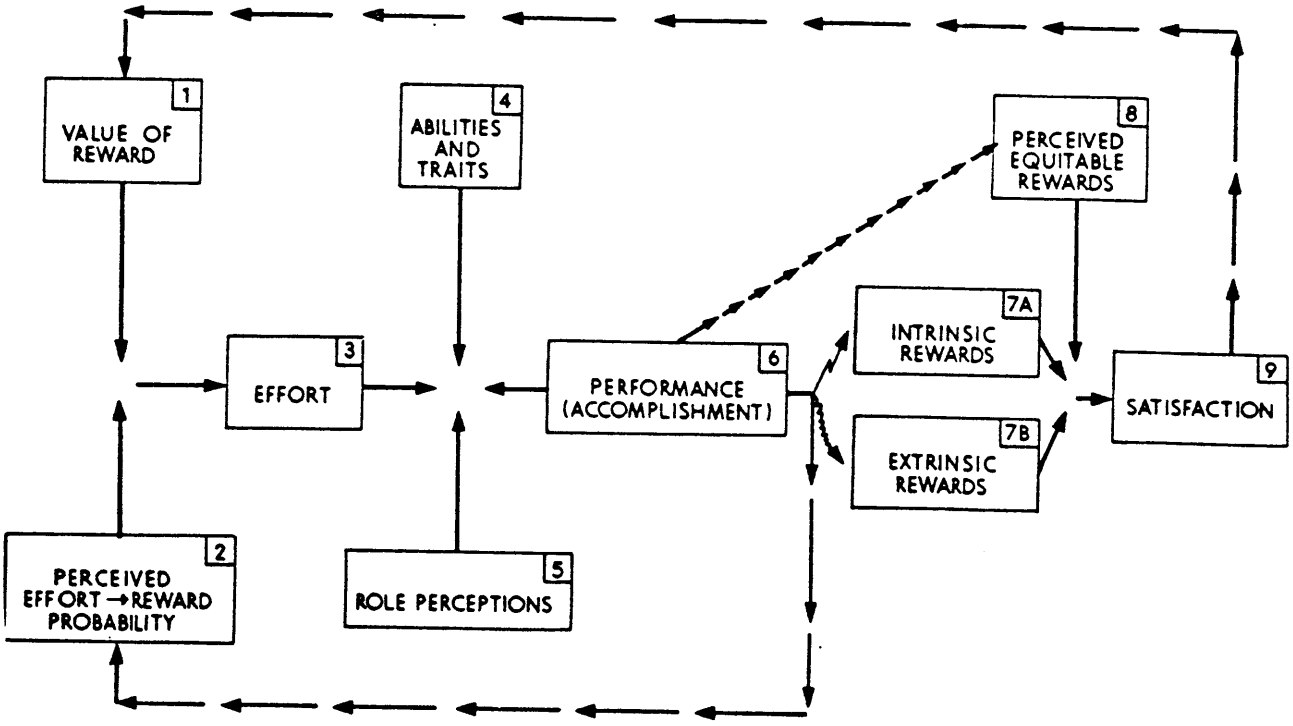
division of aspects of the work-place into "motivators" and "hygiene factors" may have been largely a function of methodology, and the present conceptual status of the theory must be considered highly uncertain. However, it must be acknowledged that the human relations view has not found universal acceptance (Jones, 1996). For example, Guest (1976) criticises the human relations school for being weak both empirically and theoretically.

Vroom (1964) developed a conceptual model of work motivation. He states that his model is similar to those developed by other investigators including Lewin (1938), Rother (1955), Peak (1955), Davidson, Suppes and Seigel (1957), Atkinson (1958b), and Tolman (1959). He claims that it is basically ahistorical in form; it is assumed that the choices made by a person among alternative courses of action are related to psychological events occurring contemporaneously with the behaviour. The theory is based on the idea that people prefer certain outcomes from their behaviour over others (valences). They anticipate (expectancy) feelings of satisfaction should the preferred outcome be achieved. In equation form Vroom's expectancy theory can be expressed as M = Sum E. V, where M= motivational force (motivation for a given form of behaviour), V= valences of all outcomes (preferences among outcomes) and E= the strength of expectancies that an action will result in the achievement of these outcomes. If valence or expectancy is zero or both are, then motivation is zero. The choice between alternative forms of behaviour is indicated by the attractiveness score.

Porter and Lawler (1968) developed Vroom's theory and designed a conceptual model of the relationship between job attitudes and job performance. The model has its roots

in the expectancy theories of motivation and attempts to specify the kinds of job attitudes that should be related to job performance. In addition, it specifies which attitudes should precede and, therefore, shape performance and which should be dependent upon performance.

Figure 3.3 Porter & Lawler Model of the Relationship Between Job Attitudes and Job Performance



Porter and Lawler model contains nine variables as shown in figure 3.3. In summary it is pointed out that effort expended does not lead directly to performance. It is mediated by individual abilities and traits, and by the person's role perceptions; reward is introduced as an intervening variable. In their model Porter and Lawler

regard motivation, satisfaction and performance as separate variables and try to explain the complex relationship among them. Porter and Lawler investigated their model in a study using 563 questionnaires completed by managers in different industrial and governmental organisations. The questionnaire measured a number of variables such as value of reward, effort-reward probability, role perceptions, perceived equitable rewards and satisfaction. The information on the managers' effort and performance was obtained from their superiors. The results indicated that as far as pay is concerned the value of reward and perceived effort-reward probability combine to influence effort.

The use of expectancy theory in research requires a considerable amount of data from research subjects including what optional behaviour they are considering, what outcomes they see as resulting from various behaviours, what valences are associated with those outcomes, and what their perceptions are of the degree of instrumentality one outcome has for another. French (1982, p87) quotes Campbell and Pritchard: "researchers have typically found positive correlations of approximately 0.25 when the valence, expectancy, and instrumentality scores have been combined and related to effort as a criterion ... Although these correlations are not high, they give sufficient credibility to the theory for extensive research to continue along this avenue".

Pinder (1991) argues that in spite of the numerous studies conducted since 1964 which have sought to test versions of the theory, very little is known about its validity. This is because, as has been the case with so much research on employee motivation, studies directed at VIE Theory have been fraught with serious flaws which make it

almost impossible to conclude whether the theory, in any of its forms, has any scientific merit (Arnold, 1981; Campbell and Pritchard, 1976; Locke, 1975; Pinder, 1977).

The controversy associated with VIE theory is further illustrated in the work of Carter and Jackson (1993, p89) who discuss the links between modernism, postmodernism and motivation. They claim that nothing new has been produced in the motivation to work (MTW) theory for the last 25 years and they argue that MTW theory effectively came to a halt with Expectancy Theory. They even go further by suggesting that Expectancy Theory represented a break with modernist MTW theory, to the extent that modernist management found it impossible to use. There is a wide acceptance that Expectancy Theory is a good model of motivation and an equally wide sense of bewilderment that it is so difficult to utilise. It must be noted, however, that the problems are not theoretical, but arise from attempts to force it into the modernist managerial strait-jacket (Carter & Jackson, 1993, p98). Carter and Jackson (1993, p93) explain "Whilst Expectancy Theory has scientific (modernist) pretensions, epistemological and methodologically (Vroom, 1964, p5, for example), it clearly represents a theory of the individual rather than a theory of management; that is, it is a theory of labour not as a homogeneous reactive group but as fragmented and proactive, instantly denying the possibility of collectivist approaches to managing MTW. Thus whilst in the context of individual psychology the theory could be seen as firmly within the classic tradition of modernism, in the context of management theory it exhibits the signs of rejection of modernist assumptions which we would now understand as emergent post modernism". Also it has been noted that the major

significance of Expectancy Theory is that it helps understanding of MTW but does not specifically solve motivational problems (Luthans, 1985): it will explain the motivation of an individual but will not tell managers how to motivate groups of employees.

3.4.2 Job Attitude

Porter and Lawler (1968) define job attitude as that it is both belief and evaluative cognition need to be considered in order to understand job behaviour. It is a powerful force and is functionally related to the productivity, stability, and adjustment of the industrial working force (Herzberg, 1993). O'Reilly (1991) offers his definition: work attitudes are typically defined as positive or negative evaluations of aspects of one's work environment.

Porter and Lawler quote a number of studies on job attitudes, for example, Lewin, Lippit and White (1939) and Coach and French (1948), which serve to emphasise the importance of individuals' attitudes and feelings about their work. In the late thirties and early forties it had become acceptable to study such things as job satisfaction and the importance of work factors. The study of workers' attitudes developed rapidly so that by the mid-fifties Herzberg et al (1957) were able to identify several hundred studies of workers' job attitudes. Also, O'Reilly (1991) reports that, while a lot of conventional research related to job attitude had been carried out, mainly concerned with the development and validation of attitude measures (e.g. Ironson et al, 1989) or with investigating antecedents and consequences of job attitudes (e.g. Frone & McFarlin, 1989; Meyer et al, 1989), new and exciting research had been looking at the

basic nature of affect in the workplace (e.g. Levin & Stokes, 1989), at the relationship between moods and work outcomes (Meyer & Shack, 1989; Sinclair, 1988), and at the expression of emotion at work (Rafaele & Sutton, 1989). O'Reilly claimed that this research gave great promise of clarifying and extending our understanding of work-related attitudes.

3.4.2.1 Factors Affecting Job Attitude and Behaviour

It is important to understand the relationship between the attitude of the worker and the resulting behaviour which determines how effectively a worker performs his/her job; responsible management wants to know whether the worker's attitude toward the job makes any difference to the way he/she works or to his/her willingness to stick with it. This could be shown by studying the factors that affect job attitude. For example, Porter and Lawler (1968, p47) found that certain structural variables such as organisational level and sub-unit size are strongly related to attitudes and behaviour. Also, it is important to study job attitudes related to satisfaction and need given their assumed relationship to the employee's desire, willingness, or motivation to come to work and to perform his/her job. Because human needs are very much a personal matter organisations can do little to change the fundamental on-the-job needs and goals of their employees. They can, however, influence how motivated employees are to perform their jobs effectively (Lawler, 1977).

The factors that influence job attitudes and behaviour of groups of workers from the point view of structure are the pulling together and directive. The degree of attachment of its members to the group, its cohesiveness, can affect the group's ability

to control the behaviour of its members; this can lead to increased production when the group accepts production as its own goal and severely curtail production when it fails to do so (Seashore, 1954); and the nature of leadership on an individual's attitude to his work. Other factors that can affect job attitudes and behaviour of workers and can be detrimental to their performance are the organisation's policies, pay, leadership style and other qualities (Herzberg, 1993). Important too is the way compensation is made, and the reasons why salaries are increased (Roethlisberger and Dickson, 1947). For example, when salary increases can only be given annually, it may be difficult for a person to regard an increase as a reward for good behaviour at other times in the year. This means that an increase may not reinforce desirable behaviour. The evaluation of performance may also have significant effects on behaviour (Tosi and Hamner, 1974). For instance, where more or less widely accepted measures are used to assess effectiveness, individuals are likely to work toward achieving those measures, rather than worrying about how they are achieved. In other cases, goals may be ambiguous, leaving individuals uncertain about what is expected of them. This uncertainty has different effects on different people. Focusing on the leader/subordinate relationship, it was found that a significant relationship existed between employee perceptions of leader behaviour and sensed performance - reward contingencies, role strain measures, work facet satisfaction, effort expended on the job and, to a lesser extent, measures of job performance (Klimoski and Hayes, 1980). In a more recent study (Scott and Bruce, 1994), which developed and tested a model on the leadership, work group relations, and individual attributes and their effect on individual innovative behaviour directly and indirectly through climate perceptions, it is reported that it provided evidence that innovative behaviour is related to the quality

of the supervisor/subordinate relationship. It also appears that high-quality dyadic relationships may give subordinates the degrees of autonomy and discretion necessary for innovation to occur.

An important factor which affects job attitudes is the organisational climate which can be said to reflect the atmosphere surrounding the organisation, the level of morale and the strength of feelings of belonging, care and goodwill among members. Organisational climate is based on members' perception of the organisation (Klimoski and Hayes, 1980). For the members of an organisation, the climate is reflected in the attitudes to and expectations of the organisation (Siegel and Kaemmerer, 1978). Siegel and Kaemmerer define an 'innovative organisation' as one that "fosters the creative functioning of its members". Also, it has been noted that innovative organisations are characterised by an orientation toward creativity and innovative change by support for their members functioning independently in the pursuit of new ideas (Kanter, 1983; Siegel & Kaemmerer, 1978) and by toleration of diversity among their members (Siegel & Kaemmerer, 1978). Jones (1996) suggests that innovatory climate is established by an environment in which scientists believe that they can work creatively, are free to use different methods of looking at problems, are encouraged to develop new ideas, and have adequate support and assistance.

Another factor affecting job attitude is working conditions. The classic experiment carried out by Roethlisberger and Dickson (1947) opened a whole field of research in human relations. Their report on the influence of working conditions on productivity led the Western Electric Company to decide in November, 1924, in association with

the National Research Council of the National Academy of Sciences, to study the "relation of quality and quantity of illumination to efficiency in industry" and the results of this study played an important part in the subsequent research of the company into employee effectiveness. Roethlisberger and Dickson conducted experiments in which the workers were consulted at every point with respect to proposed changes in working conditions. There was free expression of ideas and feelings by the workers to the management, so that the workers felt they were freely participating without pressure from above and co-operated whole-heartedly. Once the individual workers became a team, totally committed to the project, output steadily increased irrespective of the working conditions. This work provided a great stimulus to research in the field of human relations. Herzberg et al (1993), and Porter and Lawler (1968) pointed out the value of the Western Electric Studies (Mayo, 1933; 1945; and Roethlisberger and Dickson, 1939) in discovering and demonstrating that the relationship between workers and their superiors can have a potent influence on productivity. Elton Mayo (1933) emphasised the individual's social relations on the job, and the influence of social environment on the behaviour of workers. Vroom (1964) explained that the interest of psychologists in the question of the relationship between man and his work dated back as far as the early years of the twentieth century and has led to the emergence of industrial psychology and vocational guidance. Much of the early work concentrated on the measurement of aptitudes and abilities in order to improve the "fit" between the abilities of persons and the demands of their jobs thus contributing to both organisational functioning and individual adjustment.

In a study (Douglas, 1958) in which scientists were interviewed about the criteria they used in evaluating an institution as an employer or potential employer it was found that they emphasised, among other things, adequate facilities, resources and assistance from technicians. They also, wanted association with, and intellectual stimulation, from high-caliber colleagues, together with opportunities for increase in salary and status along either the administrative route or the research route.

The importance of working conditions in R&D context and their effect on innovation is confirmed by Scott and Bruce (1994, p583): "Finally, adequate supplies of such resources as equipment, facilities and time are crucial to innovation (Amabile, 1988; Angle, 1989; Taylor, 1963), and the supply of such resources is another manifestation of organisational support for innovation."

The nature of work has long been identified as a factor affecting job attitude. In a study by Ahlberg and Honey (1950) engineers and scientists who had left governmental jobs were asked to specify those conditions that made other jobs more desirable. Eighty percent listed the opportunity to do important and interesting work in an environment of freedom and individual responsibility. The work of Hackman and Oldham (1980) supports these conclusions. They identified five conceptually independent characteristics which, they argue, can be applied to any job. Those characteristics are: skill variety, task identity, task size, autonomy, and feedback. The results of their research indicate that rewards are strongly related to work attitude. Previous and subsequent studies tend to support this finding (Blauner, 1964; Kirsch &

Lengerman, 1971; Pierce & Dunham, 1976; Slims & Szilagyi, 1976; Mottaz, 1981, 1982).

Leadership style has an effect on job attitude. This is clear from the definition of leadership offered by French (1982): A leader may be defined as a person who influences the behaviour of others in the direction of the leader's goals. In this view, effective leadership within the context of the organisation is an interactive process of influencing individual and group behaviour toward the optimal attainment of the enterprise's goals. In the case of autocratic leadership, some studies suggest that group member dissatisfaction and certain dysfunctional intra-group behaviour can occur as a result. For example, during a study carried out by Baumgartel (1980) on 'leadership style', scientists expressed themselves least happy with autocratic leadership. On the other hand, behaviour patterns usually associated with democratic leadership: a high degree of participation and support, have been found, in general, to be related to desirable results. But the research suggests that democratic behaviour on the part of the leader, in contrast to laissez-faire or authoritarian behaviour, results in more positive attitudes toward the leader, a higher degree of acceptance of change, lower absentee rates, and higher production (French, 1982). The classic study by a group of investigators at the Hawthorne Works of the Western Electric Company (mentioned above) demonstrated the powerful effects of participation and recognition on production. White and Lippitt (1979) and Baumgartel (1980) suggest that a democratic approach tends to result in more positive attitudes toward the leader than is the case under both laissez-faire and autocratic leadership (French, 1982).

In contrast to the 'external' factors so far discussed as affecting job attitude, job satisfaction is 'internal'. The terms job satisfaction and job attitude are typically used interchangeably (Vroom, 1964). Both refer to affective orientations on the part of individuals toward work roles.. positive attitudes toward the job are conceptually equivalent to job satisfaction". Mullins (1989) comments that job satisfaction is more an attitude, an internal state. It can, for example, be associated with a personal feeling of achievement, either quantitative or qualitative. The concept of job satisfaction has occupied a prominent place in social science literature for many years. A vast amount of research has been conducted into this subject and related work attitudes, by both psychologists and sociologists (Mottaz, 1985). Locke (1976) reports that over 3,300 articles have been compiled on this topic to date, and the number continues to grow. One of the main reasons for the tremendous interest in this area is the belief that work satisfaction affects productivity, absenteeism and staff turnover, and hence organisational effectiveness. Another reason is the notion that work satisfaction may have important consequences for the individual in terms of physical and mental health, and satisfaction with life in general. Important too from the social psychological point of view is a positive orientation towards work, based upon a congruency between the worker's perception of the work situation, along a variety of work dimensions, and his/her work values regarding those same dimensions (Smith, Kendall, and Hulin, 1969; Locke, 1969; Kalleberg, 1977; Katzell, 1979). This view of work satisfaction suggests that two types of factors are at work: (1) perceived work characteristics, which represent work rewards; and (2) work values, which represent the importance that individuals attach to these perceived work characteristics. In this sense, work satisfaction represents a person - environment "fit" (Mottaz, 1985).

In research organisations factors pertaining to job satisfaction create great difficulty for the managers. Although research may inherently be very satisfying work, there is a compelling need to manage carefully the context in which research is undertaken (Waneta et al, 1987). It is important for managers to realise that although research scientists, as a group of professionals, have an intrinsic attachment to their work, they still need to be encouraged to perform well by means of salary increases, bonuses, or profit - sharing (Raelin, 1991). Also, to satisfy research scientists is difficult because, as mentioned earlier, of the inevitable conflict that arises between the interests of the individual and those of the organisation. Satisfaction depends on a coincidence between what is desired by the individual and what the situation provides. A closely related concept deals with harmony or conflict between what is desired by the individual and what the organisation wants of him. Does the individual want autonomy while the organisation requires co-ordination? Lack of fit between these two can generate feelings of frustration akin to the feeling of dissatisfaction (Pelz and Andrews, 1976).

Therefore the problem will always lie in maintaining a fit between the objectives of the R&D organisation to stay competitive and profitable and the interests of the scientists for achievement and self-actualisation. The organisation has to motivate the R&D scientists to keep them innovative and creative or it will lose its reputation and may even be forced out by competitors. The human resources management (HRM) literature has shown interest in the management of scientists in R&D organisation and employee relationships issues have been tackled. For example (Jones, 1996) has investigated the strategic human resource management implications of recent pressure

for change in the pharmaceutical industry and its possible effect on the R&D employees and the reputation of the companies: "Changes in the employment of R&D staff which place greater emphasis on short-term cost-savings at the expense of long-term investment will inevitably result in a declining HR reputation amongst the leading companies." (Jones, 1996, p30)

Human resources internal reputation, as will be discussed in the following section, has been established by Jones (1992a, 1996) as an important influence on the morale, motivation, productivity, retention and commitment to task and organisation of R&D scientists. In his recent study on strategic HRM Jones (1996) emphasises on the damage to motivation and commitment of R&D employees if to be given short-term contracts rather than taken on as permanent staff. He suggests (p22) that "shifting from traditional employment relationships will have important implications for the reputations of major UK pharmaceutical companies. This may ultimately threaten the motivation and commitment of R&D employees and consequently damage competitive advantage enjoyed through a long-term commitment to scientific excellence."

3.5 Internal Reputation and Research Scientists

It has been argued, in chapter 1, that the concept of human resources reputation as developed by Jones (1992a) can be a viable approach to understanding the factors that affect the relationship between research scientists and their employers in research organisations in Bahrain. Therefore, identifying the determinants of this relationship or in other words of internal reputation will help realise this objective.

3.5.1 Organisational Reputation

Literature shows that the term 'reputation' has been used to describe a number of factors related to organisational behaviour. For example, reputation reflects the company's image (Olins, 1978); signals the firm's key characteristics to its constituents (Spence, 1974); may impede management's response to environmental change (Caves and Porter, 1977); helps increase the compliance of existing employees (Kreps and Spence, 1985); takes in the organisation's response to unforeseen contingencies (Weigelt and Camerer, 1988); and is a form of normative control (Fombrun and Shanley, 1990). Dowling (1986) confirms that reputation is a very broad concept: 'Corporate audiences routinely rely on the reputations of firms in making investment decisions, career decisions, and products choices'. Hence reputation can be aimed 'at the city' and at potential customers as well as employees and potential employees. Sullivan and Hogge (1987, p295) make a similar point: 'Firstly, there was reputation in the eyes of employees and, secondly, there was reputation in the eyes of institutional shareholders'. A more sophisticated view is provided by Okun's (1981) toll model in which the firm invests in employees through the cost of recruitment and training which demonstrates its intention to provide regular work. Quits by experienced workers increase toll payments when demand increases because of the need to take on new employees. Thus, when reducing the wage 'the firm must consider how much that action would increase its toll costs through current increases in its quit rate, and furthermore how much the action would erode its investment in personnel by impairing its reputation for maintaining a reliable and predictable wage path' (Okun, 1981, p56).

The importance of establishing a good organisational reputation is supported by Kreps and Spence (1985) who suggest that enhancing 'employee welfare' increases the compliance of existing workers with management decisions and sends signals to potential employees about 'working conditions and internal norms'. Also, Stigler (1962) believes that firms which establish a good reputation for employee welfare enhance their labour market position, attract better applicants and even reduce unit labour costs, although Fombrun and Shanley (1990) believe that quantifying the link between reputation and improved organisational performance is likely to be very difficult. However, according to Weigelt and Camerer (1988, p451) an 'implicit contract' can become an effective replacement for explicit rules and regulations. Hence, unwritten rules and regulations form the 'corporate culture' while the organisation's response to 'unforeseen contingencies' and its fair treatment of employees contribute towards its reputation.

With the exception of Kanter (1983) and Guest (1989) the concept of reputation has not been widely discussed in the HRM literature. According to Kanter (1983) organisational segmentalism encourages a 'local rationality' in decision-making, a fragmentation which discourages problem-solving, creates structural barriers and stifles entrepreneurship and the spirit of innovation. In contrast, an integrative approach fosters the aggregation of problems which creates unity and loosens boundaries to stimulate organisational change. Guest (1989) identifies 'a number of foreign-owned and apparently successful firm with a reputation for their personnel/HRM policies'. These reputations are based on such policies as above-average pay, mechanisms for individual expression of grievances, monitoring through

communication systems and attitude surveys, and in some cases private health insurance and single status employees (Guest, 1989). Such policies, according to Guest, have often been pursued by foreign companies setting up on green-field sites in the UK. In many cases the implementation of HRM on greenfield sites has been combined with attempts by management to deter the setting-up of trade unions.

It is believed that organisational commitment, both attitudinal and behavioural, is linked to the concept of reputation: the attitudinal in terms of a desire for interesting and satisfying work and the behavioural in terms of a perception of the organisation as a fair employer. Coopey and Hartley (1991) claim that there has been a dramatic increase in interest in organisational commitment over the last few years, which they attribute, partly, to its central position in human resource policies. For example, the influential model of HRM described by Guest (1987) includes employee commitment to the organisation as one of its four key dimensions. Commitment is defined by Mowday et al (1982) as the desire to maintain membership of an organisation and to accept its goals and values and to work hard. However, the literature is problematic because commitment has been conceptualised in a variety of ways which makes comparisons between studies very difficult (see Angle & Perry, 1986; Guest & Dewe, 1991; Jones, 1992a). Guest and Dewe (1991) examine employee commitment to trade union or to company and comment on the possibility of dual allegiance (see Dean, 1954; Etzioni, 1975; Purcell, 1954; Gordon & Ladd, 1990). Dual commitment is of particular importance where there are professionals in organisations whose allegiance to the employer may be weaker than that of other groups (Gouldner, 1957; Kornhauser, 1962; Snow, 1959).

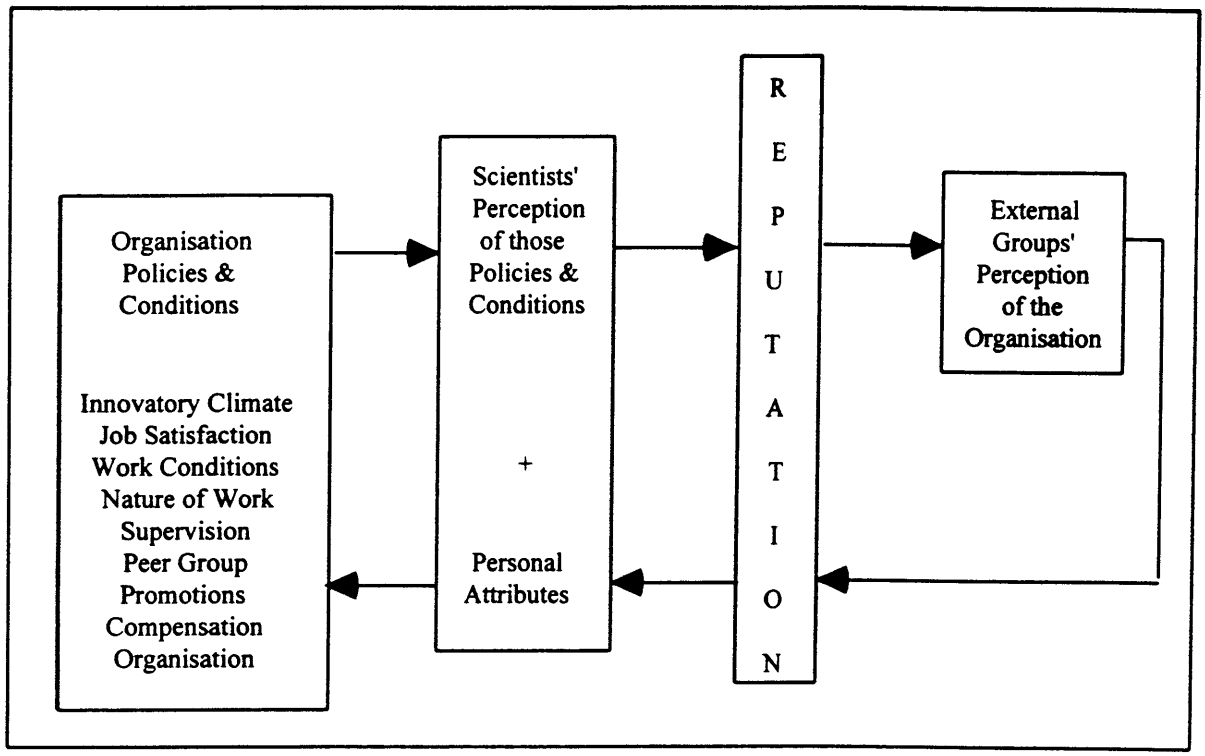
Morris et al (1992) discuss two dimensions of commitment: first, attitudinal commitment which establishes employees' identification with their employing organisation; secondly, behavioural commitment which focuses on why employees choose to remain with an organisation or to quit. In their study of graduates Morris et al (1992, p32) found that challenging and interesting work "was a significant predictor of attitudinal commitment". They also found that the issue of equity, the extent to which the company was perceived to treat employees fairly, was linked to behavioural commitment in the form of decisions to quit. Intriguingly, the issue of equity did not apparently influence decisions to stay: "Whatever the explanation, the results suggest that because perceptions of equity are critical, communication of intent and consequences as well as content of policies are of importance for employees" (Morris et al, 1992, p34).

Jones (1996) argued that although human resource policies were shown to influence attitudinal commitment in the study by Morris et al the effect was short-term and therefore companies needed to be flexible in their use of such policies. While acknowledging that extrinsic factors such as career opportunities did influence commitment Morris et al (1992, p35) pointed out that intrinsic factors were also important: "For those wishing to manage commitment, this requires a focus on the design of jobs to achieve challenge and development plus clarity in roles and responsibilities".

3.5.2 Reputation Formation Process

The process of internal reputation formation as perceived by R&D professionals is best depicted by a model developed by Jones (1992a) which is based on the work of Abratt (1989) and Kennedy (1977) who attempted to identify the determinants of corporate image. The model (Figure 3.4) shows image or reputation being formed by a process involving management, employees and external groups. Kennedy suggests that the process includes statements of company objectives, pay structures, product attributes, visible by-products, and dividend records. In Abratt's model, corporate personality determines corporate identity which includes company objectives, the development of structures and systems, performance appraisal, issue management, quality control and industrial relations. The present research is concerned with human resources reputation rather than the all-encompassing corporate image. Therefore, the 'objective' criteria considered will be those at the interface between organisational policies and scientific employees i.e. innovative climate, general job satisfaction, working conditions, nature of work, managerial style, promotions, peer groups, organisation and compensation. Independent variables were suggested by Jones on the basis of relevant literature such as that dealing with scientists in organisations (Pelz & Andrews, 1976; Cotgrove & Box, 1970; Kornhauser, 1962; Gouldner, 1957) and that dealing with creating a professional - organic climate for scientists (Burns and Stalker, 1961).

Figure 3.4 The Reputation Formation Process



In the model, reputation is the dependent variable and the remaining nine factors constitute the independent variables (see Figure 3.4) in the process of reputation formation. Company policies and conditions influence the independent variables: managerial style, working conditions, promotional opportunities, compensation, and so on. Scientists' perceptions of those policies and conditions, together with their educational background, age, sex, and work experience combine to shape their view of the department's reputation. This internal view of reputation is then transmitted to external groups primarily by those in boundary-spanning roles-employees who have regular contact with individuals or groups outside the organisation (see the literature which links 'boundary-spanning activities' to organisational effectiveness: Thompson, 1967; Bennis, 1970; Aldrich & Herker, 1977; Katz & Kahn, 1978). Reputation is

transmitted by informal as well as formal means and by indirect as well as direct contact (see Schneider et al., 1980, 1985). In addition, both Abratt (1989) and Kennedy (1977) identify a feedback process by which external groups affect internal reputation, employees' perceptions, and company policies.

Jones (1992a) used a combination of principal components and multiple regression to analyse data from 10 high-tech organisations. He established that reputation existed as a distinct construct and that the main determinants of internal reputation were innovatory climate and working conditions. However, in a subsequent work revising the original constructs through factor analysis, Jones (1996) showed that the main determinants of internal reputation are innovatory climate and job satisfaction. This research established the importance of innovative climate and job satisfaction to professionals employed in R&D. Literature dealing with scientists in organisation (Pelz & Andrews, 1976; Cotgrove & Box, 1970; Kornhauser, 1962; Burns & Stalker, 1961; Gouldner, 1957) has emphasised the importance of factors such as job satisfaction, innovatory climate and meaningful work to the intrinsic satisfaction of scientists and their motivation to work. Motivation to work well is usually related to job satisfaction, although the nature of this relationship is not clear (Mullins, 1989). Also, as mentioned earlier, one of the approaches to motivation is the 'self actualisation concept of motivation' where the neo-human relation writers focus on the content and meaning of work and on attempts to make work more intrinsically satisfying.

Links with contingency theory, which posits a connection between organic organisational structures and effective R&D activity, have also been claimed. This implies a need to ensure that professional R&D employees have the opportunity to engage in work that is intrinsically interesting; the delayering of organisations emphasises the need for job enrichment as opportunities for vertical movement up the hierarchy are reduced (Jones, 1992a).

3.5.3 Scientists and Internal Reputation

It was mentioned in the previous section that Jones (1996) confirms that human resources reputation exists as a distinct concept and that it is primarily determined by innovatory climate and job satisfaction. According to Nystrom (1990) organisational innovation can be viewed as an interaction between strategy and structure: structure emphasises organisational stability while strategy emphasises innovation and change. Hence, "a favourable company culture and climate for achieving successful innovation is viewed as one of the most important resources" (Nystrom, 1990, p144). In a recent work Spender and Kessler (1995, p41) on the management of innovation claim that despite its volume and variety, the thrust of the literature on how to manage the various stages of the innovation process is remarkably coherent. They go on to say that the literature suggests that the early stages are inhibited if there is a formal bureaucratic structure and that it seems more appropriate to structure the later stages (Daft, 1982, p136). When properly designed the 'upstream' stages should be characterised by the free flow of information, both within the organisation and from without. And Damanpour's (1991) meta-analysis of the empirical research into innovation management showed that specialisation, administrative intensity and

managerial tenure all enhanced information flow around the organisation and resulted in improved innovation performance.

Jones (1996) argues that an innovatory climate requires an environment in which scientists believe that they can work creatively, are free to use different methods of looking at problems, are encouraged to develop new ideas and have adequate support and assistance. The need to establish an innovatory climate in R&D departments has a considerable tradition in the literature (Burns & Stalker, 1961; James & Jones, 1974; Jones & James, 1979; Siegel & Kaemmerer, 1978). More recent examples include Tushman & Moore (1988), West & Farr (1990), Ekvall (1984 & 1993) and Nystrom (1990). Both Porter (1985) and Twiss (1992) identify links between a reputation for innovation, which assists with the recruitment of creative people, and competitive advantage.

Raelin (1985) identifies a number of factors which are crucial to professionals in large organisations: first, autonomy, which is 'synonymous' with the concept of professionalism, secondly, job challenge which relates to the intrinsic satisfaction that comes from the vertical expansion of work tasks, thirdly, work variety, which allows individuals to use many different skills, and finally, meaningful work. In summary, Raelin regards the challenge provided by interesting and varied work as the main motivational force for professional employees. Miller (1986, p235) also sees the intrinsic satisfaction to be gained from work as crucial to R&D professionals: "Scientists are usually attracted by the nature of work itself, the freedom to pursue their own research interests, and the people with whom they associate".

From the above it is clear that there are strong links between innovatory climate and individual job satisfaction and Jones's results confirm that working in an atmosphere which encourages freedom and autonomy is essential to establishing organisational reputation among R&D scientists. There appears also to be a link between reputation and scientists' opportunities for personal development and career advancement. As organisations restructure their operations and delayer middle management, many professionals will have to settle for jobs in which there are few promotional opportunities. Consequently, issues of 'job enrichment' will become increasingly important in ensuring that scientists remain motivated without the prospect of moving up the hierarchy.

Jones (1996) discusses the increasingly turbulent competitive environments that have placed considerable pressure on organisations to change their cultures: delayering, restructuring and greater autonomy for those at the lower levels have direct implications for the way in which jobs are designed. The supposed shift from modern to postmodernist organisation also emphasises democracy, empowerment, multi-skilling and flexible skilling, and 'organic' structures based on trust between leaders and led (Clegg, 1990). As Tsoukas (1992) notes, the modern-postmodernist dichotomy described by Clegg is a revised version of the mechanistic-organic divide. The model developed by Burns and Stalker (1961) has been extensively used by those interested in the management of innovative organisations (Abbey and Dickson, 1983; Keller and Holland, 1983; Pelz and Andrews, 1976; Tornatzsky and Fleischer, 1990; Amara, 1990). Organic structural characteristics include the lack of a hierarchy of authority and control, less centralisation of knowledge, greater adjustment and

redefinition of tasks through employee interaction, more emphasis on lateral communication and the attribution of less importance to managerial control by rules and regulations (Kedia et al, 1992, p4).

3.6 Cross Cultural Behaviour of Scientists

As discussed earlier, the issue of cultural difference has to be addressed, and the literature concerned with the effects of culture on people's attitudes and behaviour has to be reviewed in order to make possible a proper comparison between the findings of my research and the UK study of R&D scientists (Jones, 1992a). It is important because national culture, and organisational culture in particular, have a lot to do with people's behaviour and performance and form an essential part of any social study in this field. On the relationship between social culture and organisational culture, Enz (1986) argues that organisations carry and reflect the dominant societal way of thinking and acting. Kedia et al (1992, p2) elaborate on this argument; they say that organisational culture is a passive transmitter of the overarching societal culture, and that individual and group behaviour is more likely to be influenced by the overall culture rather than by any distinctive organisational culture. Would the differences in culture between Britain and Bahrain produce different responses to the same questionnaire and shed some light on the attitudes of research scientists in the two countries towards their R&D organisations, which would affect their productivity? It is hoped that the inclusion of questions on culture used by Hofstede (1980) will help to find an answer.

Hofstede's work was used as a basis for investigating the work-related values of scientists and their effect on the R&D productivity by Kedia et al (1992) who claimed that the findings of their study confirmed Hofstede's (1980) conclusion that values derived from national cultures could be predictive of organisational functioning. Kedia et al (1992, p14) argued that the organic characteristics of organisations (Burns & Stalker, 1961) were associated with greater R&D productivity (Abbey & Dickson, 1983) and that at the societal level these organisational characteristics were similar to the features found in the low power distance countries designated by Hofstede (1980). In organisations in low power distance countries it is likely that more organic features will be found than in organisations in higher power distance countries (Kedia et al, 1992, p14). Kedia et al concluded that the higher R&D productivity might indeed be the result of the lower power distance character of a society rather than of the independent organic characteristics of organisations. Kedia et al claim that at a theoretical level the results of their study provide a link between the cultural properties of a society and the characteristics of organisations which can enhance an understanding of the conditions that contribute to greater R&D productivity. These results are also generally supportive of contemporary organisation theory that posits a fit between organic organisational characteristics and productive R&D activity (Tornatzky & Fleischer, 1990).

3.6.1 Effect of Culture on Behaviour

> "How fundamental a phenomenon culture really is. It affects not only our daily practices: the way we live, are brought up, manage, are managed and die; but also the theories we are able to develop to explain our practices. No part of our lives is exempt from culture's influence." (Hofstede, 1991, p170)

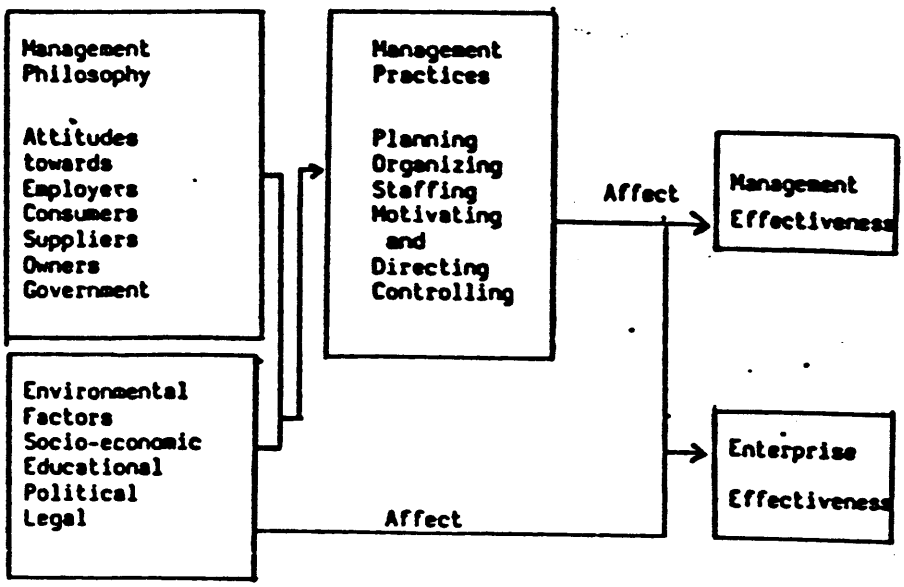
Many studies have concluded that culture has a major impact on the way in which individuals and groups work. The impact of culture on the behaviour of people within work systems appears to be greater than the impact of culture on the systems themselves (Alder, 1983). It is important to understand culture and its effect since it is a man-made part of man's environment. It is the sum of man's knowledge, beliefs, art, morals, laws, customs and the habits acquired by man as a member of society (Fleishman, 1967). This is supported by Mead's (1966) definition of culture as the tradition, customs, norms, beliefs, values and thought-patterning which are passed down from generation to generation.

Studies have demonstrated that the relative importance of different needs varies across cultures. They show that the ways various needs manifest themselves are quite different in different cultures (Abaallkhail, 1988). Winston (1984) found considerable differences in the need for achievement among those with different cultural backgrounds. For example, he observed that achievement was valued much more in North America than in South America. Nevertheless, the universal theory, based upon an international managerial culture, attributes any differences between managers to personal differences, and differences of situation and organisation rather than cultural variation. This was the view taken by Child (1982) who reviewed a number of cross-cultural studies and concluded that there was a tendency toward convergence among organisations in different cultures. Organisations are becoming more and more similar across cultures (Abaalkhail, 1988).

Hofstede (1983, p89), however, takes a contrary view to that of Child and emphasises the role culture plays in management. He states: "Most present day management theories are 'ethnocentric', that is, they take the cultural environment of the theories for granted. What we need is more cultural sensitivity in management theories; we could call the result 'organisational anthropology'. It is unlikely to be the product of one single country's intellectual effort; it needs by definition a synergy between ideas from different sources... the convergence of management will never come. What we can bring about is an understanding of how the culture in which we grew up and which is clear to us affects our thinking differently from other people's thinking, and what this means for the transfer of management practices and theories. What this can lead to is a better ability to manage inter-cultural negotiations and multi-cultural organisations like the United Nations, which are essential."

The effect of cultural factors on management practices and effectiveness was investigated by Negandhi and Prasad (1971). They developed a model (Figure 3.5) which treated management philosophy as an independent factor. They argued that if environmental and cultural factors were the main determinants of management practices and effectiveness, one would expect close similarities in the management practices of two comparable industrial enterprises in one country. Negandhi and Prasad used as an example the two American retail chains of Montgomery Ward and Sears Roebuck, which are basically in the same business and confronted with similar market and environmental conditions. Their model identifies basically the same external environment but recognises management philosophy as an independent variable.

Figure 3.5 Negandhi and Prasad Model



In a study to establish whether or not American organisational concepts could be transferred to other cultures, Sekeran (1981) examined two concepts of job involvement and job satisfaction. Two questions were asked:

1- to what extent are the measures of job involvement and job satisfaction developed in the United States appropriate for India?

2- what, if any, are the similarities and differences among the predictors of job involvement and job satisfaction in the two cultures?

The study sample comprised 267 randomly selected bank employees in the United States and 307 in India. His predictors included the following:

1- Demographic characteristics: age, education, sex, tenure and income;

2- Personality characteristics: achievement, affiliation, autonomy, dominance, protestant ethic, locus of control, and tolerance for ambiguity;

3- Organisational climate factors; participation in decision-making, communication, stress and self-esteem.

Sekeran (1981) found that both measures of job involvement and job satisfaction developed for the United States were appropriate and applicable to India. The findings indicated that the organisational climate variable 'self-esteem from the work place' was important for job involvement in both cultures, as was the length of time spent in the organisation, measuring age and tenure. Job satisfaction, job variety and stress were found to be common predictors in both cultures. Income was found to be a predictor of job satisfaction in the United States but not in India, a difference attributed to difference in organisational policy. The conclusion of Sekeran's study was that American organisational concepts and measurements were transferable to another culture.

The role of culture in comparative management research was studied by Kelley and Worthley (1981). In their research, three groups made up the data source: Caucasian-American, Japanese-American, and Japanese managers. The study took place in Hawii, and the samples consisted of 41 Japanese-American, 27 Caucasia-American, and 62 Japanese. The managerial levels, ages and education of the subjects were similar. The Caucasian-American and Japanese-American groups shared the same economic system, education and culture. The only common factor between the Japanese-American and Japanese managers was cultural. A 15 item questionnaire

measured the differences in managerial attitudes. It employed a five-point Likert-type scale ranging from 'strongly disagree' to 'strongly agree'.

Kelley and Worthley used two statistical tests to analyse their data. The first test showed a dissimilarity between American and Japanese managers. The results of the second test indicated the role which culture played in the formation of the managerial attitudes of respondents. Of eleven items predicting significant differences, the Japanese group was separated from at least one American group in respect of all eleven and from both American groups in respect of eight. There was a significant difference between the two American groups on only three items. Their conclusion was that 'national' and 'cultural' differences were important in the formulation of managerial attitudes of respondents.

Research scientists working in organisations have a professional culture which emphasises the commitment they have to science in contrast to the corporate culture which emphasises managerial control. This professional culture and its differences from corporate culture are best shown by the five points put by Raelin (1991, p105-24):

(i) Autonomy over Ends as Well as Means. The most critical problem in the management of professionals as managers expect professionals to adhere to the goals and objectives of the organisation, while professionals are suspicious of the role of managers and supervisors.

(ii) Over specialisation of Technical Skills. There is an inherent danger in R&D work that "segmentation" leads to over specialisation; employees become highly skilled in a very specific area.

(iii) Overemphasis on Professional Standards of Evaluation. Scientists expect to be evaluated on the basis of their activities not by their conformity to the "rules." Consequently, conflict can arise because of managerial demands for adherence to bureaucratic standards and scientists' desire to adhere to professional standards.

(iv) Lack of Interest in Real-World Problems. Raelin links this feature to the difficulty professionals have in making the transition from higher education to work. "The best students, those who have excelled in acquiring the norms, skills, and values of the profession, are often the ones who have the most difficulty in adjusting during their initial employment experiences". The true "cosmopolitan" may in fact, because of his/her commitment to science, never be fully socialised into an organisation.

(v) Disregard of Organisational Procedures. In order to achieve higher levels of efficiency, managers will attempt to "routinize" work, emphasising profits and efficiency rather than growth, innovation, and quality. Professionals, with their emphasis on individuality, will try to resist conformity and standardised decision making.

Sapienza (1995) sees culture as the major organisational characteristic, representing the human aspect of an organisation as opposed to the technical aspect. She claims that in order to have an energetic and enthusiastic (motivated) R&D organisation the technical and the human aspects of the job and the technical and human aspects of the manager and his scientists' personal competencies must match.

3.6.2 Hofstede's Study/Cultures and Organisations

The results of the present study on internal reputation as perceived by scientists in research organisations in Bahrain will, as I have said above, be compared with the results of a study by Jones (1992a) on the perceptions of R&D scientists of the internal reputation of ten high technology organisations in Britain. It has also been suggested that cultural difference may have an effect on the responses of the scientists. But, since the UK study did not include questions on the effects of culture, a direct comparison will not be possible. This problem can be resolved indirectly by

using the results of a study by Hofstede (1980) on national culture carried out amongst IBM employees in 50 countries and 3 regions, in which four dimensions responsible for variations in culture amongst the countries were measured. Amongst these countries were Britain and a group of Arab-speaking countries. This study on 'Cultures and Organisations' will be discussed in more detail in the following chapter (Chapter 4). The four cultural dimensions and the salient features of each dimension will be presented together with some examples of the questions that Hofstede asked. The results of this study for Britain and some of the Arab countries, including Saudi Arabia which shares a common religion, culture and language with Bahrain, will be presented in the discussion chapter (Chapter 7) together with the results for Bahrain in order to make a comparison between Britain and Bahrain as far as these dimensions are concerned.

3.7 Summary of Literature

In conclusion in this chapter I have tried to set out the factors that can affect the scientists perceptions of their place of work and relationships between them and their employers, reflected in their attitudes and behaviours. In order to achieve this I have examined the literature that have dealt with the needs that motivate employees and give rise to specific behaviour, namely content and process theories of motivation.

However, prior to examining literature relevant to motivation I have set the scene by looking at the literature which defined and classified research and presented the characteristics of scientific professionals and the problems associated with their management. In this context, Raelin (1991) commented about the natural conflict

between management and professionals based on the differences in their educational background, socialisation values, vocational interests, work habits and out look.

Literature associated with the various approaches to motivation have been discussed (Mullins, 1989, Hellriegel & Slocum, 1989, O'Reilly, 1991) for example, human relation approach (Mayo, 1933), neo-human relations or content approach (Maslow, 1943 & 1954, Herzberg, 1959; McGregor, 1960), process approach (Vroom, 1964; Porter & Lawler, 1968), and Contingency approach (Burns & Stalker, 1961; Lawrence & Lorsch, 1969; Woodward, 1980).

Having discussed approaches to motivations, theories of motivation both content and process were discussed next in order to help understand the attitudes and behaviour of employees in organisations. The literature discussed related to the work of Maslow (1954), Alderfer (1969), Herzberg (1959), Vroom (1964) and Porter and Lawler (1968). The discussion of the motivation theories prepared the ground for discussing job attitude and the factors that affect job attitude and behaviour of workers with emphasis on the R & D scientists. Factors such as innovatory climate has been supported by Kanter (1983), Siegel and Kaemmerer (1978), and Jones (1996) and deemed crucial for creativity called for in R & D situations.

Following this the literature on internal reputation was discussed. It was argued in the outset of chapter one that factors affecting job attitudes and behaviours are parallel to those responsible for the determination of internal reputation which helps to understand the relationship between the employer and the scientists in research

organisations (Jones, 1992a). The main body of the literature discussed in this regard has been the work of Jones (1992a & 1996) on the determinants of human resources reputation. In this work factors such as innovatory climate, job satisfaction, work conditions, nature of work, managerial style, and pay have been studied and responses from R & D scientists have been analysed.

It was necessary to look at the effect of culture on job attitude and behaviour of scientists in research organisations in Bahrain, especially since it was intended to compare the results of the current study with that of Jones (1992a & 1996). For this purpose literature pertaining to national and organisational culture and their effect on behaviour have been discussed with emphasis on the work of Hofstede (1980) and Kedia et al (1992). On the impact of culture Hofstede (1991, p170) writes " No part of our lives is exempt from culture's influence".

3.8 Conclusion

The main purpose of this chapter has been to look critically at the literature on theories of motivation, job attitude and behaviour in general, then to look at these in the context of research scientists with a view to understanding the factors that could affect their job attitude, in parallel with the factors that could affect the relationship between scientists and their employers i.e. the internal reputation of their departments.

In section two of the chapter some definitions of research and types of research, in particular a classification of R&D activities, were given. In section three, some problems associated with the management of scientists were discussed with a view to

identifying the kind of factors that affect scientists' attitudes toward their work. In section four some definitions of motivation and job attitudes were presented and discussed, together with factors affecting job attitude and behaviour, with a view to identifying those factors that can affect the attitude and behaviour of scientists and assist in studying the relationships between them and their organisations i.e. their perceptions of internal reputation.

Section five has been concerned with the development of the concept of internal reputation within the context of scientists in research organisations, i.e. human resources reputation. Some factors affecting the attitude and behaviour of scientists and therefore the relationships between them and their employers have been identified, such as innovatory climate, job satisfaction, the nature of work, and working conditions.

In section six of the chapter some literature related to the effect of culture on behaviour was presented in general and elements that form the basis of professional culture were discussed with a view to understanding the cultural factors that can affect scientists' relationships with their managers and their perceptions of the internal reputation of their place of work. Also presented in this section was the work of Hofstede on differences of culture in various countries with reference to the four dimensions developed in that study. This has been done to facilitate a comparison between the results of the present research and those of a similar study carried out on R&D scientists in the UK.

Chapter Four

Research Hypotheses and Methodology

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Chapter Four

Research Hypotheses and Methodology

4.1 Research Hypotheses

This research is based on the proposition that organisations with good reputations can attract, retain and motivate high quality employees. Scientists in the governmental departments and/or organisations in Bahrain involved in research were included in the study. Their level of education ranged from a minimum of Bachelor of Science degree (BSc) to Master of Science (MSc) and Doctor of Philosophy (PhD). The purpose of the study was to establish the determinants of reputation as perceived by the research scientists i.e. internal reputation in the sense of whether their organisation was a good or bad place to work. Therefore a number of hypotheses regarding the factors which one might expect to be associated with departments reputation amongst research scientists will be put forward.

From the preliminary survey and some semi-structured interviews with research scientists and their supervisors (Appendices 1 and 2) which I carried out in some governmental research departments in Bahrain in order to identify at first hand the kind of problems they faced and the attitudes they had towards their work, I found a considerable amount of evidence that they needed an innovative environment, the prospect of career fulfilment and self actualisation, good communication policies, autonomy and stimulating work, which gave them more satisfaction than high salaries, important as these were to them - i.e. the emphasis was on work that was

intrinsically interesting. Earlier researchers concerned with innovation (Burns & Stalker, 1961; Hull, 1988) and with professionalism (Gouldner, 1957; Cotgrove & Box, 1970) clearly identify a need to establish an innovatory climate by providing professionals in organisations with work that is intrinsically interesting. While Morris et al (1992) find challenging and engaging work to be a significant determinant of attitudinal commitment, Raelin (1985) identifies a number of factors which are crucial to the concept of professionalisation such as autonomy, job challenge, which relates to the intrinsic satisfaction that comes from the vertical expansion of work tasks, work variety and meaningful work. Also, Miller (1986) found the intrinsic satisfaction to be gained from work as crucial to R&D professionals. Mottaz (1985) refers to task dimension, within the context of work rewards leading to work satisfaction, as the intrinsic rewards directly associated with 'doing the job', which are derived from the content of the task itself and include such factors as interesting and challenging work, self direction and responsibility, variety, creativity, opportunities to use one's skills and abilities and sufficient feedback regarding the effectiveness of one's effort. Jones (1996) has confirmed that innovative climate and general job satisfaction are the main determinants of the reputation of institutions among R&D scientists in Britain by examining the relationship between scientists and their R&D department. Therefore, given the distinctive nature of research work, I hypothesise that innovative climate is the main determinant of internal reputation and general job satisfaction is the second most important factor in establishing the internal reputation of research departments amongst Bahraini scientists.

Wad (1985) found that reliable sources of expertise, information, material input and finance are needed to ensure a stable and continuous R&D process. Putti (1986) concluded that it is extremely difficult to be aware of modern technology and the instruments needed for research activities. Adapting modern technology to suit the local conditions and training people to use such technology can be a major problem. Goldberg and Kirschenbaum (1988) concluded that a positive work-setting was important for establishing strong organisational attachment amongst scientists. In particular, good communication policies are crucial in stimulating 'high' scientific performance (Pelz and Andrews, 1976). Jones (1992a) confirmed that working conditions were the second most important factor in establishing internal reputation. Accordingly I hypothesise that working conditions are the third most important factor determining the relationship between research scientists and their employers in research departments in Bahrain and that as such it will be a determinant of internal reputation in so far as it conditions their perception of their place of work as good or bad.

I also intend to test the two main hypotheses of Jones (1992a) that the nature of the work and the managerial style will be important factors in establishing internal reputation, together with the proposition that reputation will be identifiably different in different groups in the department. This will be done for two reasons. First, as was pointed out at the beginning of the thesis, one of the objectives of the present study is to compare its results regarding internal reputation with those of Jones (1992a). Secondly, in the preliminary surveys I carried out (Appendices 1 and 2) research scientists expressed opinions on the aspects of work which were important to

them. They demanded work which was stimulating and challenging and worthwhile, in that the results they produced were of practical value. Also, they stressed the need for a participative style of management which led to their being involved in the choice of the research work to be done. It was essential too that their supervisors should have adequate scientific and the technical expertise. On the basis of this and the literature referred to below, I decided to hypothesise that the nature of the work and the managerial style would be the fourth and fifth most important factors in establishing good reputation.

Miller (1986) regards the nature of work as an important factor in attracting high quality R&D scientists to an organisation. Also Pelz and Andrews (1976) point to the close relationship between scientific productivity and work-related freedom/autonomy. Bailyn (1985) confirmed the importance of operational autonomy to R&D professionals. Cotgrove and Box (1970) identified dissatisfied scientists as those whose work was not stimulating or challenging. Jones (1992a) argued on the basis of the literature on professionalism that, the nature of work is of a prime importance in attracting and motivating professional employees in organisations.

Miller (1986) regards 'self-management' as the decisive factor in establishing a match between the professional and his work. Pelz and Andrews (1976) asserted that scientists engaged on research needed freedom from managerial interference to work effectively. Pelz and Andrews also emphasised the importance of good communications, contact between colleagues and contact between management and scientists in the creation of a productive research climate. The contingency theorists

(Burns and Stalker, 1961; Hull, 1988) posit that bureaucratic managerial control is incompatible with the creation of an innovatory climate.

Pelz and Andrews (1976) make a number of points about differences related to education; they identified clear differences in the motivation of PhDs and non-PhDs. Goldberg and Kirschenbaum (1988) found that older employees displayed greater organisational commitment than younger employees. Toren and King (1982) also identified differences in the orientation of PhDs and non-PhDs which were related to socialisation during the course of doctoral study. Based on this Jones states the hypothesis that reputation will vary among the various groups within the department, based on age, length of service, number of employers, qualification or field of specialisation and sex. In the present study I also propose to test whether reputation varies from one group to another in the research departments in Bahrain.

Now the research hypotheses can be stated formally as follows:

h1. Innovatory climate will be the main determinant of reputation.

h2. Job satisfaction will be the second most important factor in establishing internal reputation.

h3. Work conditions will be the third most important factor in establishing internal reputation.

h4. The nature of work will be the fourth most important factor in establishing internal reputation.

h5. Managerial style will be the fifth most important factor in establishing internal reputation.

h6. Reputation will be identifiably different according to the group or groups in the department to which a scientist belongs:

a) older research scientists will rate reputation higher than their younger colleagues,

b) those with a PhD qualification will rate reputation lower than those with lower qualifications, and

c) male and female will differ in their ratings (but the nature of the difference is not specified).

4.2 Questionnaire Construction

At the beginning of the thesis I stated that I was going to replicate the UK study (Jones, 1992a) by using the same questionnaire in Bahrain to identify the determinants of internal reputation. The only difference will be the omission of questions related to membership of trade unions, since these do not exist in Bahrain, and the inclusion of some personal points, for example the field of a research scientist's specialisation, and questions on 'culture', which it is thought might prompt different responses to the same questions in the two countries. Therefore, much of the description related to the questionnaire will be the same as that produced by Jones except for the comments on culture.

The models of Abratt (1989) and Kennedy (1977), described in the previous chapter, were broadly followed in developing the ideas about the determinants of internal reputation. As explained above, innovatory climate, job satisfaction, working conditions, the nature of work, and managerial style are hypothesised to be the main determinants of reputation and therefore constructs related to these factors are central to the thesis.

To investigate the concept of reputation fully, other factors directly related to the employer/employee relationship were included. One of the sources used for developing these factors was the literature on commitment which uses a variety of independent variables. Table (4.1) gives a summary of the variables most relevant to the present research (Jones, 1992a). Other sources were used in developing the factors considered relevant to human resources reputation. In particular, 'The Experience of Work' (Cook, Hepworth, Wall, and Warr, 1981), which is 'a compendium and review' of 249 measures previously used, was the main source of information on instruments and scales. Many of the sources referred to by Cook et al formed the basis of the various scales in the literature on commitment.

Table (4.1) Antecedents of Commitment

Bateman & Strasser	Fukami & Larson	Magenau et al	Mottaz
Leader Punishment	Job Scope	Employer Characteristics	Intrinsic Rewards
Reward Behaviours	Job Stress	Work-Related Characteristics	Extrinsic Rewards
Job Characteristics	Pay Equity	Personal Characteristics	Work Values
Centralisation	Quality of Supervision		Demographic Characteristics
Need for Achievement	Personal Characteristics		
Perceived Environment			
Job Tension			
Job Satisfaction			
Biographical			

It was necessary first to establish the extent to which a particular department was perceived to be 'innovatory'. Burns and Stalker (1961) demonstrated the importance of creating a professional-organic climate for scientists and engineers. Siegel and

Kaemmerer (1978) developed a questionnaire designed to classify the dimensions of 'climate' in innovative organisations. The questionnaire included 225 statements grouped into five dimensions 'thought to be characteristic' of such organisations: leadership, ownership, norms for diversity, continuous development, and consistency. Following a pilot study, the data were examined by Factor Analysis and the main factor, accounting for 66% of the variance, was 'support for creativity'. These results formed the basis of the Siegel Scale of Support for Innovation (SSSI) (Siegel and Kaemmerer, 1978).

A measure of overall job satisfaction was included. Scales measuring overall job satisfaction usually involve 'general evaluative reactions to a job without citing specific features' (Cook et al, 1980, p13). This measure will assist in understanding the importance of reputation to the research scientists; it may also help establish that reputation is independent of job satisfaction i.e. the two constructs are similar and reputation adds little to the understanding of organisational behaviour.

Jones and James (1979) attempted to develop a comprehensive measure of perceptions of work environment which was also useful. The authors identified six distinct dimensions of psychological climate. These were: organisational goals and objectives, job challenge, leader facilitation and support, work-group co-operation, professional and organisational esprit, and job standards. These components were found to be consistent across a variety of samples.

The Index of Organisational Reactions (IOR) was particularly useful in identifying important aspects of the employer - employee relationship and was extensively consulted. This index has eight scales: supervision, kind of work, amount of work, physical conditions of work, co-workers, financial elements, career future, and company identification. The IOR has been used as the basis of questionnaires in a variety of work situations (Dunham, Smith and Blacburn, 1977).

Cook et al reviewed 29 instruments designed to investigate features related to the 'specific satisfaction' of paid employment. The main features covered by these 29 instruments (including the IOR) were; supervision, co-workers, working conditions, promotion prospects, pay, job security, and work. As each of these scales had been extensively used in previous research they were considered to provide a sound basis for investigating the determinants of human resources reputation.

Based on the literature referred to above, the factors were believed to be most relevant to the employer-employee relationships can be identified as follows:

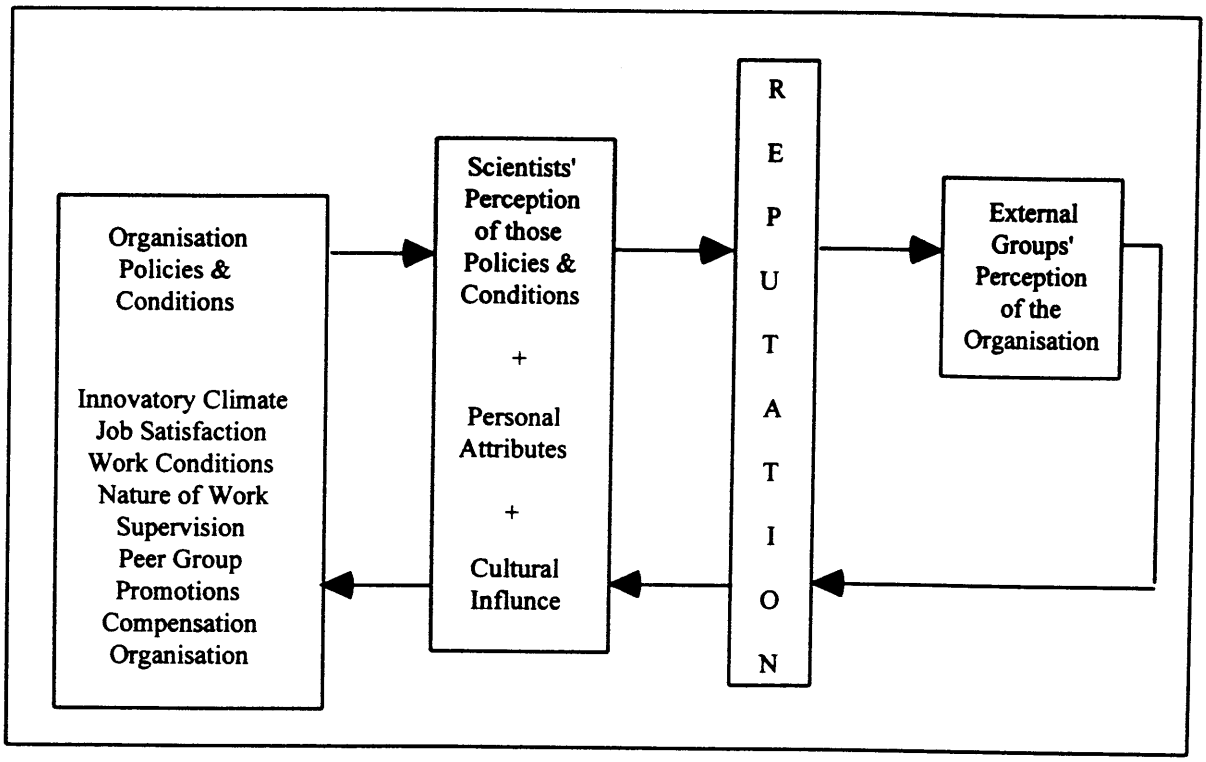
- Innovatory climate.
- General job satisfaction.
- Working conditions.
- Nature of work.
- Managerial style.
- Promotional opportunities.
- Peer group relationships.
- Organisational policies.
- Compensation/remuneration.
- Personal characteristics.

After deciding that these 'constructs' would form the basis of the research it was then necessary to create specific scales. Even though many of the instruments mentioned above contained constructs with similar titles, none was considered to be entirely suitable for this research. As Pennings (1973) points out: 'Agreement on the naming of variables does not necessarily imply conceptual and/or operational agreement'. However, to ensure reliability and validity existing scales were used whenever possible. In many cases there was considerable redundancy amongst the items and numbers were reduced. In total, 98 items were used for the nine constructs (not including personal characteristics). It is intended to use factor analysis to confirm that the items do actually form constructs which are consistent with those authorised above.

The nine factors are investigated at the point of employee perception. I was primarily concerned to establish the employees' perception of these factors and the extent to which they contributed to reputation. Figure (4.1) describes the process of reputation formation based on Jones (1992a), with one modification to take account of the cultural dimension, which will be discussed in the following section, together with the effect of personal attributes. Organisation policies and conditions are responsible for establishing the way in which work is done, innovatory climate, job satisfaction, work conditions, and so on. Scientists' perceptions of those policies and conditions together with their educational background, age, sex, and work experience, in addition to their 'culture', will as I have suggested, combine to form a view of the department's reputation. This internal view of reputation is then transmitted to

external groups, primarily by employees who have regular contact with individuals or groups outside the organisation.

Figure (4.1) The Reputation Formation Process



There are two caveats. First, strictly speaking (Jones, 1992a) peer group relationships are not within the control of management, beyond the basic administrative decisions on the composition of project teams and work-groups. However, previous research has indicated the importance of considering relationships amongst peer groups. Secondly, general job satisfaction could be considered to be an outcome of the other factors rather than itself a factor in the process of reputation formation. Nevertheless, many studies have included general job satisfaction as an antecedent (Jones, 1992a) and for reasons discussed earlier it is also included in the present research.

As figure (4.1) shows there will be a 'feedback' process. In fact, there are a number of ways in which information is transmitted back to the 'sender':

1. The scientists' perception of policies and conditions will feedback to higher management. The obviously has the potential to influence future managerial decisions.

2. The way in which the organisation/department is perceived by external groups will feedback both to employees and to management. Such feedback may lead to the modification or reinforcement of employee opinion and organisational culture or to managerial changes in policies and conditions.

While these feedback processes are not regarded as trivial or unimportant to the concept of reputation, a detailed investigation was considered beyond the scope of this research (Jones, 1992a).

The main instrument of data collection was an extensive questionnaire based on the constructs discussed above (Appendix 4) and completed by individual research scientists in the governmental research organisations in Bahrain. Where possible, questionnaire data were supplemented by semi-structured interviews, based on the main headings in the questionnaire. The questionnaire contained 98 'Likert- style' questions rated from 1 to 5, of which 52 (53%) were reverse scored. Each scale had an appropriate legend dependent upon the content of the question.

1	2	3	4	5
small extent		some extent		large extent

The questionnaire also contained six dummy variables (yes/no) and four 'open' questions, plus two questions which required one or more boxes to be ticked. The questions were grouped into nine discrete categories, plus 'personal details', as shown below:

A- Personal details.
B- Innovatory climate.
C. General job satisfaction.
D. Work conditions.
E. Nature of work.
F. Management.
G. Promotion.
H. Peer group.
I. Organisation.
J. Compensation.
K. Reputation.

In the following section a brief description is given of the theoretical considerations underpinning each of the categories including cultural influence. A small pilot study was carried out to test the efficacy of the questionnaire. The questions were designed to elicit a rapid reply rather than requiring a great deal of deliberation which would increase the central tendency. It was found that 25 to 30 minutes was adequate for people to respond to the questions. A covering letter was also written (Appendix 3).

4.2.1 The Questionnaire: Theoretical Issues

A. Personal Details

Although the questionnaire was designed to be completed anonymously it was necessary to have a certain amount of biographical data. The attitude of scientists to

their department's reputation was expected to be dependent on age, length of service, number of employers, educational level, field of specialisation and sex.

B. Innovatory Climate

Innovative climate is central to the attraction and retention of high-quality employees. Creating an innovatory climate is associated with higher levels of 'inventively' (Burns and Stalker, 1961). The professional-organismic (or organic) environment is more effective than the mechanistic-bureaucratic environment in stimulating innovation (Burns and Stalker, 1961; Hull, 1988). The belief that scientists should want to work in an atmosphere that fosters high-quality scientific research underpins the proposed model of reputation. 'Innovatory climate' encourages respondents to indicate their view of the prevailing departmental climate, particularly, whether new ideas were encouraged, whether scientists were encouraged to look at new ways of solving problems, if they felt their work was evaluated by results rather than means, and the degree of assistance available for developing new ideas. Therefore, I hypothesise that innovative climate will be the best predictor of reputation.

C. General Job Satisfaction

In order to attract and retain the best scientific staff, research organisations are challenged to understand the factors influencing the job satisfaction of scientists (Waneta, 1987). The scientists were asked to indicate the degree to which they were satisfied with their job. Confirmation was sought by means of three further questions: first, the individuals were asked if they would choose to join the same department again; secondly, whether or not they would recommend the department to a friend

who wanted a job as a scientist and thirdly, how desirable a profession research was in terms of providing career fulfilment. Therefore, I hypothesise that 'overall job satisfaction' would be one of the best predictors of reputation.

D. Work Conditions

A positive work-setting is important for establishing strong organisational attachment amongst scientists (Goldberg and Kirschenbaum, 1988). In particular, good communication policies are crucial in stimulating 'high' scientific performance (Pelz and Andrews, 1976). Therefore, I hypothesise that work conditions will be the third determinant of reputation. This category was designed to establish scientists' views on a number of issues related to their conditions of work: first, the physical working environment and its effect on the way in which individuals performed their tasks; secondly, the goals and objectives of the department and the degree to which scientists were committed to those goals; thirdly, the main sources of departmental and organisational information; and fourthly, the scientist's perception of the way in which organisational policies were applied in the department. A number of other factors were also addressed: work pressure, security of employment, inter-departmental relations, the opportunity for individual development, morale and productivity, and the provision of resources.

E. Nature of Work

The nature of work is an important factor in attracting and retaining high-quality employees. Miller (1986) suggests that scientists are primarily attracted to an organisation by the nature of the work. Scientists seek a climate in which it is

possible to fulfil their personal and professional objectives. If such a climate exists, that is, the intrinsic nature of the work is satisfying, then 'organisational attachment' will be high (Goldberg and Kirschenbaum, 1988). The intrinsic satisfaction available from work and the opportunity for self-actualisation leads to satisfaction and motivation for the majority of scientists (Pelz and Andrews, 1976). Cotgrove and Box (1970) found that scientists were dissatisfied primarily because they were under-utilised and work was not demanding. It was, therefore, hypothesised that the 'nature of work' would be an important predictor of reputation.

F. Management

Scientists in organisations present management with a distinct set of problems. Raelin (1991) identifies a 'clash of cultures' between managers and professionals epitomised in scientists' demand for autonomy over ends as well as means. Self-direction is crucial for stimulating high levels of scientific output (Pelz and Andrews, 1976). 'Self-management' is the most crucial aspect of establishing a good reputation as an employer of scientists (Miller, 1986). Consequently, the organisational 'need' to establish managerial 'control' must be tempered by the necessity to accommodate scientists' desire for considerable autonomy from managerial control. Therefore, I hypothesise that management 'style' will be an important predictor of reputation.

G. Promotion

Continual training and development is the key to the Quality of Professional Life (QPL) (Miller, 1986). 'Vanguard companies' are committed to lifelong training, particularly in science-related industries (O'Toole, 1985 and 1987). Extrinsic

rewards, such as a good salary, administrative authority, and the opportunity to associate with higher management, are all related to high levels of achievement (Pelz and Andrews, 1976). The problems of managing career development and promotion are an important factor in the motivation and morale of R&D employees. Scientists will be concerned to work for organisations that provide good training and career development. The opportunity to advance without the need to take on managerial responsibility is also important. A 'dual ladder' enables those committed to a career in science to advance in status and monetary terms.

H. Peer Group

Specialist task groupings are synonymous with professional orientation in organisations (Kornhauser, 1962). Regular communication between members of a work group are associated with higher scientific output (Pelz and Andrews, 1976). 'Peer group' examines personal relationships and the way in which they influence the individual's view of the department, in particular, the amount of teamwork and how easy it is to approach other members of the department for help, advice, and reassurance.

I. Organisation

Although the focus was the research department it cannot be viewed in isolation from the organisation as a whole. The links between research and the rest of the organisation will dictate the extent to which there are common employment policies and human resource strategies. Burns and Stalker (1961) referred to this as the degree of 'integration' between department and organisation.

This section used a series of 'open' questions to ascertain each individual's attitude to the organisation in terms of future employment plans. First, employees were asked about their original reasons for choosing the organisation as an employer and the extent to which their expectations had been fulfilled. Secondly, employees dissatisfied with their choice of organisation were invited to indicate the reasons for that dissatisfaction. Finally, all respondents were asked if they were seeking a new job, and if so, the main influence on the choice of their next employer.

J. Compensation

As Toren and King (1982) point out, it is implicit in the literature on professionalism that scientists are not concerned with organisational advancement or financial benefits. However, in their own research Toren and King established that PhDs actually scored higher on economic and organisational orientation than non-PhDs. Consequently, this research set out to establish how scientists felt about their salaries and whether or not remuneration encourage commitment to work and department. The extent to which individuals thought that their salary reflected their educational attainments, particularly in comparison with other occupations, was also examined.

K. Reputation

The final section asked two questions and the scientists were given a choice of seven responses:

How would you describe the department's reputation, is it a good or bad place to work?

How do you think most other people in the department regard its reputation?

1	2	3	4	5	6	7
very bad	bad	below average	average	good	very good	excellent

I wanted to compare the individual's perception of reputation with what they believed their peers felt about the department.

Cultural Influence

As mentioned before, Jones (1992a) did not use constructs related to 'culture' in his questionnaire when he studied the perceptions of R&D scientists in Britain. But the question of cultural differences had to be addressed in order to facilitate a comparison between the findings of my research, which examines the perceptions of the research scientists in Bahrain towards their work, and those of Jones. For this purpose a study by Hofstede (1980) on culture, which included Britain and a group of Arab-speaking countries, was as mentioned earlier, consulted.

The methodology of the study was based on a questionnaire distributed among IBM employees in the same kind of positions in 53 countries. The questions cover four basic problem areas as defined by Inleles and Levinson (1954). These correspond to dimensions which Hofstede called power distance, collectivism versus individualism, femininity versus masculinity and uncertainty avoidance. A mean score was computed for the answers of a comparable sample of people from each country or the percentage was computed of people choosing particular answers. A statistical procedure (factor analysis) was used to sort the survey questions into factors or clusters, for which the mean scores or percentages appeared to vary together.

Hofstede's findings have been questioned on a variety of grounds. The most important of these is that the data were derived from the employees of a single corporation, that they were collected more than 20 years ago, and that mean scores for whole countries necessarily obscure substantial within-country variations. Furthermore, it is very likely that there are additional dimensions of cross-national variation which did not emerge because they were not represented in Hofstede's questionnaire. Despite this, Hofstede's concepts continue to provide the best available basis for approaching cross-national differences in many aspects of organisational performance. Concepts such as collectivism, power distance and uncertainty avoidance may be used not simply to classify countries, but also to organise data concerning human resource management in single-country studies and to guide the design of selection procedures and training programmes (Smith, 1992).

The four dimensions used in the Hofstede questionnaire and replicated in my research in order to identify the type of culture Bahrain belongs to, are as follows:

1- Power Distance

This dimension is designed to convey the dependence relationship in a country. In small power distance countries there is limited dependence of subordinates on bosses, and a preference for consultation. In large power countries there is considerable dependence of subordinates on bosses and the emotional distance between subordinates and their bosses is large: subordinates are unlikely to approach and contradict their bosses directly.

2- Individualism and Collectivism

Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. Individualist culture is associated strongly with personal time, freedom and challenge, while collectivism, as its opposite, pertains to societies in which people from birth onwards are integrated into strong, cohesive in-groups, which throughout people's

lifetime continue to protect them in exchange for unquestioning loyalty. A collectivist culture is strongly associated with training, physical conditions and use of skills.

3- Masculinity and Femininity

Masculinity pertains to societies in which social gender roles are clearly distinct (i.e. men are supposed to be assertive, tough, and focused on material success whereas women are supposed to be more modest, tender, and concerned with the quality of life). Femininity pertains to societies in which social gender overlaps (i.e. both men and women are supposed to be modest, tender, and concerned with the quality of life). Hofstede's study showed that the masculine pole was associated with earnings, recognition, advancement, and challenge, while the feminine pole was associated with co-operation, living area, and employment security.

4- Uncertainty Avoidance

This dimension is defined as the extent to which the members of a culture feel threatened by uncertain or unknown situations. This feeling is, among other things, expressed through nervous stress and a need for predictability: a need for written and unwritten rules.

The following are examples of the questions that were used in the Hofstede questionnaire (in relation to the Power Distance dimension):

Q1- How frequently, in your experience, does the following problem occur:

'employees being afraid to express disagreement with their managers?

1	2	3	4	5
very frequently	frequently	average	seldom	very seldom

Q2- What is your boss's usual decision-making style?

Q3- What is your preference for your boss's decision-making style?

1	2	3	4	5
autocratic	paternalistic style	on the contrary	based on majority vote	none of these

The results as regards the culture of Bahrain will be discussed in Chapter 7 together with Hofstede's results for Britain.

4.2.2 The Questionnaire:

Reliability and Validity

The issues relating to the reliability and validity of the variables are discussed in Appendix 6. The items related to the 'culture' constructs are assumed to be reliable since they have been used extensively in well-known studies by Hofstede since 1980 (Smith, 1992). Using items extensively employed in other research ensured that the variables did actually 'operationalise' the theoretical concept.

4.3 Selecting the Sample

Originally the intention was to collect data only from scientists whose task was to do research within the governmental research organisations in Bahrain. This gave rise to difficulty given the limited number of departments whose main function is research and the fact that the sample would therefore be too small to enable any meaningful conclusions to be drawn from the responses. Therefore, after consulting my supervisors, I decided to include all the governmental departments/organisations, part of whose work is conducting research. In order to do this I first had to identify them. For this purpose I designed a questionnaire (Appendix 1) to identify those departments; it also provided other information such as the expenditure on research and back-up facilities. Based on the criterion that the department/organisation should conduct work related to research such as surveys, preparation of technical reports and surveys, research departments within sixteen ministries and/or organisations were

chosen to be included in the sample. These are the Directorate of Fisheries and the Directorate of Agriculture Research in the Ministry of Agriculture and Commerce, the Directorate of Economic Research in the Bahrain Monetary Agency, the Environmental Protection Committee in the Ministry of Health, the Directorate of Organisation and the Labour Force in the Civil Service Bureau, the Department of Educational Evaluation and Curricula Development Research, the Educational Research and Development Centre in the Ministry of Education, the Directorate of Evaluation and Economic Research in the Ministry of Finance and National Economy, the Directorate of Industrial Development in the Ministry of Development and Industry, the Labour Force Studies Department and the Social Research Department in the Ministry of Labour and Social Affairs, the Al-Areen Wildlife Sanctuary in the Ministry of State for Cabinet Affairs, the Studies and Research Department in the Ministry of Housing, the Communications Office in the Ministry of Transportation and the Bahrain Centre for Studies and Research. In addition, some other departments that do work similar to research in the Ministry of Works, Power and Water, the Ministry of Foreign Affairs and the Central Statistics Organisation were included.

As stated above, a decision was taken to include all governmental research departments in order that the sample should be reasonably representative. However, there was considerable variation in the size of the departments. While this was not particularly desirable there was nothing to be done if the research was to proceed.

4.3.1 Survey of Governmental Research Departments: Research Infra-Structure

Dependable information and statistics on the governmental research organisations in Bahrain are scarce. As explained earlier, a questionnaire (Appendix 1) was designed to obtain information about the infra-structure for research, the departments involved in research, the qualifications and the number of research scientists, the number of libraries, books, periodicals, and laboratories, the number of research projects carried out; and the total expenditure on research for the period 1987-1991 i.e. during the period prior to the start of the study.

At first the questionnaire was distributed randomly to all governmental departments that I thought might carry out research activity of any kind with the intention of drawing up a short list later. However, the response was very poor, so I decided to write a letter to the senior officials in the ministries and organisations in which I explained the purpose of my study and hence the need to identify the departments that did research and the nature of their work. A number of organisations responded and a few more research departments were identified for inclusion in the research sample after I had interviewed their managers and explained the purpose of the research to them.

Three basic problems were encountered. First, the diversity and duplication in the definition of 'research'. Secondly the inaccurate statistics on expenditure on research, especially given that in many departments the research budget was included in the overall budget and was therefore difficult to estimate. Thirdly, in some departments

such figures are considered confidential. The results of the survey have been used in chapters 2 and 3 to support the overview of research in Bahrain.

4.3.2 Survey of Governmental Research Departments: Research Scientists Attitudes

Prior to formulating the hypotheses concerning the perceptions of internal reputation of Bahraini research scientists, I carried out a number of semi-structured interviews with scientists and their supervisors in a number of government research departments, in order to identify the kind of problems they faced in the course of their work and the attitudes they had developed towards the place of their work. I designed a questionnaire which I used in this survey (Appendix 2). It contained eleven open-ended questions. Questions 1 and 2 were general questions concerning the origins of research in Bahrain and the problems that scientists faced in general. Question 3 was concerned with the scientists' perception of the way they were managed. In question 4 I asked whether the researchers faced difficulties in obtaining the information they needed. In question 5 the issues of participation in decision-making and encouragement of opinions and ideas were addressed. Question 6 was related to the availability of incentives and their scope. Question 7 touched on the issue of autonomy. In question 8 the question of the credibility of the work carried out was raised. The personal aspirations of the researchers were explored in question 9. In question 10 suggestions for the development of creative and innovative research were sought.

I contacted the scientists and made appointments with them and explained the purpose of my interview. During the interviews I noted their comments on the questions as they were put to them. In summary there was a consensus on the issues of innovative environment, autonomy, the chance of career fulfilment and self-actualisation, and stimulating and challenging work.

4.4 The Sampling Method

The questionnaire was intended to be completed by research scientists working in the governmental departments/organisations in Bahrain. For the purpose of the study, 'research scientist' was defined as someone who had obtained at least a Bachelor degree (BSc/BA) and whose work was relevant partially or fully to research work and not merely someone whose job title included a reference to research. Thus the respondents would include research scientists under different titles such as specialists, economists, engineers, statisticians and researchers.

In order to fulfil the primary research objective of establishing the determinants of reputation, the intention was to obtain a broadly representative sample in terms of age, tenure, qualifications, sex, and seniority of all departmental 'research scientists'. With this in mind I realised that I had to maximise the potential sample, in view of the fact that the total number of scientists employed by the government departments and organisations included in the research was comparatively small (220), if I was to be able to draw any meaningful inferences.

Table 4.2 Department/Organisation Response Rates

Department/Organisation	No of Questionnaires Sent	No of Questionnaires Returned	Response Rate
Minist1	4	2	50%
Minist2	15	10	66.7%
Minist3	26	21	80.8%
Minist4	20	17	85%
Minist5	11	6	54.5%
Minist6	5	4	80%
Minist7	1	1	100%
Minist8	26	21	80.8%
Minist9	2	2	100%
Minist10	38	26	68.4%
Minist11	24	17	70.8%
Minist12	19	13	68.4%
Orgn1	5	4	80%
Orgn2	6	2	33.3%
Orgn3	4	4	100%
Orgn4	14	13	92.9%
Total	220	163	74%

I visited the departments and explained my mission to them and requested each manager to deliver the questionnaire, plus a covering letter and a self-addressed envelope (in which to return the completed form directly to myself at BCSR) to the research scientists in the department. And some questionnaires were posted directly to individuals in the departments. The manager then distributed the questionnaires to

a cross-section of the department employees. On completion, the respondents returned their questionnaire to BCSR in the pre-paid envelope having received an assurance that their answers would be treated in total confidentiality and their organisations would have no access to them. This was made clear in the covering letter (Appendix 3). Table 4.2 gives the response rates for the various departments and research organisations. A total of 220 questionnaires were distributed and 101 completed questionnaires were posted back. This I regarded as an unsatisfactory response rate, especially after the numerous calls I had made to the research scientists to respond. I personally called those employees whose work was related to research in the Ministry of Power, Works and Water, the Ministry of Transport, the Ministry of Commerce and Agriculture, the Ministry of Development and Industry and some other organisations and asked them to participate, arguing that the findings of such research would be to the benefit of professionals such as themselves. As a result an additional 62 responded. Therefore, the total number of questionnaires returned was 163, which improved the response rate from 46% to 74%.

4.5 Describing the Sample

Table (4.3) summarises the characteristics of the sample. These will be discussed in chapter 6 in which I analyse differences according to age, tenure, number of previous employers, academic qualifications, field of specialisation and sex.

It is believed that the responses of the various sub-groups will vary substantially. Therefore the composition of each group is analysed. The number of male respondents was 109 (67%) and the number of females 54 (33%). As regards

academic qualifications almost 67% of the total sample possessed a BSc and 43 (26%) a MSc, and only 9 (6%) had a PhD. Those who specialised in sciences were 67 (41%) and in social sciences 50 (31%), while 28% did not respond to the specialisation question.

Table 4.3 Social Data - Total Sample

SEX				Age	F	%
Male	%	Female	%	25-29	22	14
109	67	54	33	30-35	59	36
				36-40	47	29
				41-45	30	19
				46-50	3	2

Qualification						Field			
BSc	%	MSc	%	PhD	%	Science	%	Social Sciences	%
109	67	43	26	9	6	67	41	50	31

Marital Status				Number of Children	F	%
Single	%	Married	%			
26	16	136	83	1	23	14
				2	26	16
				3	30	18
				4	20	12
				5	5	3
				6	2	1

Length of Service	F	%	Number of Employers	F	%
1-5	31	19	1	47	29
6-10	30	18	2	57	35
11-15	50	31	3 or more	59	36
16-20	36	22			
21-25	11	7			
26-30	1	1			

The age distribution showed that 14% were 25-29 years old, 36% were 30-35, 29% 36-40, 19% 41-45 years and only 2% 46-50. That is, the majority of the respondents fell within the 30-35 age group (36%), followed by the 36-40 age group (29%), giving a total majority of 65% in the range of 30-40. The tenure distribution showed that research scientists with 1-5 years length of service constituted 19% of the sample, those with 6-10 years 18%, those with 11-15 years 31%, those with 16-20 years 22%, those with 21-25 years 7% and those with 26 and over only 1%. That is, the sample showed reasonable distribution for all the groups except for those with more than 20 years of service. The number of employers rate was almost even for the three groups. Those with one employer totalled 47 and made up 29% of the sample, those with two employers 57 (35%) and those with three employers and more 59 (36%).

4.6 Conclusion

In chapter four I presented the research hypotheses and methodology. The primary objective of the research is to establish the main determinants of internal reputation in the perceptions of scientists in governmental research departments/organisations in Bahrain with a view to comparing the results with those that Jones (1992a) obtained for R&D scientists in Britain. After stating the research hypotheses, I described the questionnaire construction, and the way each variable is related to the literature concerning scientists in organisations.

In the final three sections, I discussed the sample. It consisted of members of research departments in sixteen ministries and organisations in addition to people in research departments in the Ministry of Works, Power and Water, the Ministry of Foreign

Affairs and the Central Statistics Organisation. A total of 220 questionnaires were distributed. The number of respondents was 163, representing a response rate of 74%. The composition of the sample was 67% male and 33% female, of whom 67% had obtained a BSc/BA, 26% a MSc and 6% a PhD. The age distribution was 14% aged 25-29 years, 36% 30-35, 29% 36-40 and 20% over 40.

Chapter Five

Determining Internal Reputation

Data Analysis 1

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Chapter Five

Determining Internal Reputation

Data Analysis 1

This research attempts to identify the main determinants of internal reputation amongst research scientists in Bahrain, and to compare the results with a similar study (Jones, 1992a) of R&D scientists in the United Kingdom. The results are discussed in chapter 7. Nine constructs were identified as relevant to the relationship between research scientists and their place of work (i.e. its reputation). Chapter 4 describes those constructs. Further analysis is dependent on establishing the 'reliability' of these variables. This chapter consists of eight sections, in the first of which I will provide details of the results of the tests to establish whether or not the variables have internal consistency. In the second section I examine by principal components analysis the constructs that have low alpha coefficient in an attempt to identify 'clusters' of items. In section three I consider the measure of reputation identified by Jones (1992a) and this is followed by a discussion of a new distribution for all the items through factor analysis since it was thought to be due to the a difference of culture between Bahrain and the UK that new clusters of items for reputation and the other constructs appear. The fourth section examines the correlation between each independent variable and reputation (REPUT2) as identified by factor analysis of my data in the previous section. Initially, a matrix showing the correlation between all the variables was constructed. In section five multiple regression analysis was applied to the original variables and (REPUT2) to identify the variables that provide the best

'explanation' of reputation. Section six identifies alternative dependent variables after a discussion of the multi-collinearity amongst the independent variables. In section seven the variables that are thought to have an indirect effect on reputation are discussed. Finally a summary of the chapter is presented in section eight. This Chapter concentrates on the full range of data from the 163 responses, while chapter six will analyse the differences between the social groups.

5.1 Defining Reliability and Validity

In the social sciences "measurement is a process involving both theoretical as well as empirical considerations" (Carmines and Zeller, 1979, p10). The empirical considerations are normally responses to a questionnaire or verbal replies to a question, while the theoretical considerations relate to concepts which the response is assumed to represent. 'Measurement' is concerned with establishing the relationship between the response and the concept.

There are two basic properties required of empirical data. First, it should give the same results on repeated tests or trials, that is, it should be reliable. It is impossible to eliminate all errors, but it is important to establish the nature of any error. Secondly, a test should actually 'measure' what it is intended to measure. 'Validity' is 'the crucial relationship between concept and the indicator' (Carmines and Zeller, 1979, p12). Data can be reliable without having validity.

To the extent to which measurement error is slight, a measure is said to be reliable. Reliability concerns the extent to which measurements are repeatable, when different

persons make the measurements, on different occasions, with supposedly alternative instruments for measuring the same thing and when there are small variations in circumstances that are not intended to influence the results. In other words, measurements are intended to be stable over a variety of conditions in which essentially the same results should be obtained (Nunnally, 1978, p191). Reliability depends entirely on the average correlation among items and the number of items (Nunnally, 1978, p212).

Validity

In a very general sense, a measuring instrument is valid if it does what it is intended to do. Validation always requires empirical investigation, with the nature of the evidence required depending on the type of validity. With one type of validity the empirical evidence depends mainly on gathering opinions regarding the reasonableness of various aspects of developing and employing a measuring instrument; but this still concerns evidence from the real world (Nunnally, 1978, p86-7). 'Construct validity' is an important type of validity which is particularly relevant to measurement in the behavioural sciences which is, as a psychological science, concerned with establishing functional relations among important variables (Nunnally, 1978, p95). "To the extent that a variable is abstract rather than concrete, we speak of it as being a construct" (Nunnally, 1978, p96). It is particularly important that theoretical considerations should guide the way in which variables are added to the construct and determine the extent to which all, or at least some, of the variables correlate with each other (Nunnally, 1967). When analysing the results, there are three possible outcomes. First, the items are highly correlated, all measuring the same

thing. Second, the items split into a number of clusters suggesting that more than one construct is being measured. Third, the correlations are near to zero indicating that different things are being measured.

Reliability

Estimates of reliability based on the average correlation among items within a test are said to concern 'internal consistency'. Coefficient alpha is the basic formula for determining reliability on the basis of internal consistency (Nunnally, 1978, p229-30). The alpha figure is dependent on the average correlation between items and the number of items in any construct. "As a general rule, we believe that reliability should not be below 0.80 for widely used scales. At that level correlations are attenuated very little by random measurement error" (Carmines and Zeller, 1979, p51). Nunnally (1978, p245), discussing what a satisfactory level of reliability is, argues that it depends on how a measure is being used. On predictor tests or hypothesised measures of a construct, one saves time and energy by working with instruments that have only modest reliability, for which purpose reliability of .70 or higher will suffice. In general survey situations "measuring instruments usually need only to be reliable enough to distinguish between very broad groups of informants" (McKennel, 1970, p236). Although McKennel agreed that an alpha figure as low as 0.5 might occasionally be acceptable, he warned the researcher to be 'seriously concerned' if reliability fell below the level of 0.6.

5.1.1 Reliability and the Empirical Data

Each of the nine 'variables' discussed in chapter 4 was constructed from a number of related items. Initially, the broad concept for each variable was drawn from the appropriate literature. Contributory items were then selected for all variables from previously used scales. Individual items were chosen because they contributed to the main variable. For example, the first three items in the 'nature of work' were:

i) the amount of achievement obtained from work
ii) the proportion of work which generates real enthusiasm
iii) the extent to which work provides variety

It was necessary to examine the variables individually and confirm that every item contributed to the overall scale. Unless it was established that the variables had acceptable levels of reliability, conclusions drawn from the data would be meaningless. The reliability of each construct was assessed using Cronbach's alpha coefficient, which is based on the 'internal consistency' of a variable. Coefficient alpha measures the average correlation of items within a test (Norusis, 1988).

Nunnally (1978) recommends an alpha of 0.8 as the minimum acceptable figure for reliability and this was the target figure for the nine variables. They were tested and figures for alpha below 0.8 were obtained for PROM (0.7599) and ORGN (0.7437). The remaining variables displayed substantial alpha indicating strong internal reliability (0.8 and over) after the items which were not strongly related to the other items in the scale had been removed. This was done by a procedure called 'item-total statistics' which summarises the relationship between the individual items and the

composite score. These statistics also show the effect on the average score if a particular item was excluded from the scale. Table 5.1 and table 5.2 show the item total statistics for the peer group (PEER) construct.

Table 5.1 Item total Statistics - PEER

	Mean if Item Deleted	Variance if Item Deleted	Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PEER1	19.1370	5.7466	.3344	.3260	.3088
PEER2	20.2260	8.9210	-.4158	.2314	.6543
PEER3	20.1781	9.2784	-.5486	.3660	.6315
PEER4	18.7329	5.6316	.4520	.3710	.2659
PEER5	19.6438	4.2033	.5916	.5401	.0914
PEER6	19.3904	4.3500	.6478	.6998	.0821
PEER7	19.3767	4.2502	.6088	.6091	.0878

'Corrected item-total correlation' describes the Pearson correlation coefficient between the score on the individual item and the sum of the scores on the remaining items (Norusis, 1988). Table 5.1 shows that if item PEER2, which is the weakest relating to the other items, is deleted the alpha will increase to 0.6543. As a result item PEER2 was removed from the PEER construct and the statistics re-examined.

Table 5.2 Item-total Statistics - PEER

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PEER1	16.5822	6.7001	.4275	.3106	.5979
PEER3	17.6233	11.0226	-.5796	.3634	.8392
PEER4	16.1781	6.6026	.5456	.3368	.5664
PEER5	17.0890	5.0610	.6655	.5400	.4818
PEER6	16.8356	5.1590	.7450	.6919	.4554
PEER7	16.8219	5.1957	.6588	.6064	.4882

This procedure was repeated until the removal of further items did not improve the alpha coefficient. Table 5.2 shows that it was only necessary to remove one more item (PEER3) to obtain the best possible value for alpha (0.8383). In the following section, I describe which particular items were eliminated for each of the nine variables.

5.1.1.1 The Nature of Work (WORK)

WORK was constructed from twenty one individual items which were presumed to contribute to WORK. Since question 19 was a dummy item requiring a Yes/No response and asked respondents to indicate whether or not they had published any work in a recognised scientific journal during the last five years, it was not included in the first test of reliability. The first test of reliability on the remaining 20 items gave an alpha of 0.6497. 'WORK15', the amount of time spent on research work, was identified as the weakest item and eliminated. Four more items were eliminated following subsequent retests: 'WORK9' describing the 'workload'; WORK16a, and c, on the frequency of work-related discussions with someone outside the department and with his immediate superior; and 'WORK18', on opportunities to hold seminars. The alpha coefficient for the remaining fifteen items was 0.8134 and the mean inter-item correlation improved from 11.3% on the first test to 23.7% on the final test.

5.1.1.2 Management Style (MGT)

MGT comprised 17 items. All were included in the first test of reliability which gave a very strong alpha value of 0.9110 with a mean inter-item correlation of 37%.

5.1.1.3 Promotional Opportunities (PROM)

'PROM' consisted of nine individual questions including one 'dummy' and one 'selective' question. 'PROM8' which asked if it was possible to gain promotion without the need to take on managerial responsibility and 'PROM9' which asked the respondents to indicate whether it was departmental policy to encourage employees to take out patents, present papers, or attend conferences were not included in the first test of reliability, which gave an alpha of 0.4272 for the remaining seven items. A further two items were eliminated to improve alpha to 0.7599 with a mean inter-item correlation of 39.3%. These were 'PROM1' on feelings about future employment prospects and 'PROM5' on the adequacy of training. The reliability could not be increased any further and it was decided to examine the construct by factor analysis.

5.1.1.4 Work Conditions (WCON)

'WCON' comprised twenty one items. 'WCON9' was an 'open' question which asked respondents to indicate the main source of information about a) the department, and b) the organisation, so it was not included in the first test of reliability which gave a strong alpha value of 0.8594 for the remaining 20 items with a mean inter-item correlation of 23.3%.

5.1.1.5 Peer Group (PEER)

'PEER' consisted of seven items all of which were included in the first test of reliability which gave a value for alpha of 0.4164 with a mean inter-item correlation of 6.7%. Eliminating 'PEER2', on the amount of perceived departmental 'friction';

and 'PEER3', on the scientific expertise of co-scientists, increased alpha to 0.8383 with a mean of 50.5%.

5.1.1.6 Organisation (ORGN)

'ORGN' consisted of thirteen items. Four were not included in the first test of reliability: 'ORGN12', which asked the respondent to indicate whether or not he was seeking a new job in another organisation; 'ORGN9', 'ORGN11', and 'ORGN13', which were 'open' questions asking respondents to indicate their main reason for joining their present employer, the cause of dissatisfaction, if any, and the main influence on the choice of a new employer. The alpha score for the remaining nine questions was 0.5512. Removing 'ORGN5', on integration between the research department and the remainder of the organisation; 'ORGN6', which asked the respondent if he would prefer to be doing research work of some other kind; and 'ORGN1' on the importance of employee welfare in the organisation, increased the value of alpha to 0.7437. The reliability could not be increased further and it was decided to examine the construct by factor analysis.

5.1.1.7 Compensation (PAY)

'PAY' consisted of nine items. Four were not included in the first test of reliability; 'PAY6' required the respondents to indicate which of four methods were used for determining departmental salary increases; 'PAY7', 'PAY8', and 'PAY9' were dummy questions requiring a Yes/No response. The remaining five items gave an alpha of 0.8584 with a mean inter-item correlation of 53.9%.

5.1.1.8 General Job Satisfaction (JSAT)

'JSAT' consisted of only four items which gave an alpha of 0.7232. When 'JSAT4', on the extent to which research provided good opportunities for career fulfilment, was eliminated, the alpha increased to 0.8152 with a mean inter-item correlation of 59.6%.

5.1.1.9 Innovative Climate (INNO)

'INNO' consisted of nine items. The first test of alpha was 0.8316 with a mean inter-item correlation of 33.5%.

5.2 Principal Components Analysis

Nunnally (1978) posits that a reliability of 0.7 and over is sufficient. Carmines and Zeller (1979) and McKennel (1970) agree that it is legitimate to use constructs with alphas of less than 0.8.

I decided therefore that the reliability value for the 'PROM' construct (alpha of 0.7599) was close enough to 0.8 and should remain as an independent variable for the remainder of the analysis, especially given that when it was examined by factor analysis, it was found, as table 5.3 shows, that it has one factor with an Eigen value greater than one, with a Kaiser-Meyer-Olkin measure of sampling adequacy of 0.8078 and a Bartlett test of sphericity equal to 320 at a significance level of .00000. This factor includes the same items as in the final test of alpha reliability (PROM2, PROM3, PROM4, PROM6 and PROM7). These results confirm that 'PROM' was a coherent construct and I decided to be used in its truncated form for the remaining analysis.

Table 5.3 Reliability Test and Factor Analysis for 'PROM'

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.3926	.1746	.6014	.4268	3.4447	.0117

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
PROM2	11.9221	7.1704	.6579	.4630	.6689
PROM3	11.9351	7.6820	.6213	.4297	.6871
PROM4	11.9935	8.3071	.4184	.2312	.7536
PROM6	12.9805	7.5879	.4688	.2784	.7413
PROM7	11.9221	7.8632	.4972	.2508	.7274

Alpha = .7599 Standardized item alpha = .7637

- - - - - - - - - - - - F A C T O R A N A L Y S I S - - - - - - - - - - - -

Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .80782

Bartlett Test of Sphericity = 320.97469, Significance = .00000

Rotated Factor Matrix:

	Factor 1
PROM2	.83068
PROM3	.76994
PROM6	.66810
PROM7	.62405
PROM4	.60693

Organisation (ORGN) had an alpha of 0.7437, so I decided to examine the construct using principal components analysis to establish whether the items produced any significant 'clustering'. A Kaiser-Meyer-Olkin measure of sampling adequacy of 0.7335 was obtained and the Bartlett test of sphericity gave a figure of 264 with a significance level of .00000. Two factors with an Eigen value greater than one were extracted and they accounted for 49% of the total variance. Factor 1 had an Eigen value of 3.13 and accounted for 34.8% of the variance and factor 2 had an Eigen value

of 1.28 and accounted for 14.3% of the variance. Varimax rotation differentiated the two factors in terms of their constituent items (Table 5.4). Factor 1, comprising 'ORGN2', 'ORGN3', and 'ORGN10', was heavily loaded on the way the organisation was rated in terms of scientific and academic standards by 'outsiders' (ACADM). Factor 2, comprising 'ORGN4', 'ORGN6', 'ORGN7' and 'ORGN8', was heavily loaded in relation to scientists' satisfaction with their organisation (SATIS). As principal components analysis identified two coherent factors, ORGN was replaced by ACADM and SATIS for the remaining analysis. Thus the number of independent variables was raised to ten.

Table 5.4 Principal Components Analysis - ORGN

Factor 1	**ACADM - Scientific and Academic Reputation**
Item ORGN2	-How highly do you think your organisation's scientific expertise is rated by competitors in similar organisations?
Item ORGN3	-How highly do you think your organisation is rated in terms of 'academic' credibility?
Item ORGN10	-Are you satisfied with your choice of employer?
Factor 2	**SATIS - Satisfaction with Organisation**
ORGN4	- How closely do you identify with the nature of the research work in the organisation?
ORGN6	-By choice, would you prefer to be doing research work of some other kind?
ORGN7	-In research, are you treated as a 'stockholder' in the organisation? (i.e., someone who has a long-term interest in the organisation)
ORGN8	-To what extent is 'organisation prestige' (i.e., well-known to family and friends) important to you?

5.3 REPUT As A Measure of Reputation

The main determinants of internal reputation amongst research scientists in Bahrain were hypothesised to be amongst the ten independent variables identified earlier as relevant to the relationship between research scientists and their place of work. Jones (1992a) concluded that REPUT was a better measure of internal reputation than REP1, which concerned the extent to which the individual perceived his department to be a good or a bad place to work in, and REP2, which concerned reputation as most other people in a department regarded it.

Table 5.5 The Reputation (REPUT) Items

ORGN2	How highly do you think your organisation's scientific expertise is rated by competitors in similar organisations?
ORGN3	How highly do you think your organisation rated in terms of 'academic credibility'?
WCON14	Do you think the R&D department has a good image in the organisation in general?
REP1	How would you describe the departments reputation, i.e. is it a good or bad place to work?
REP2	How do you think most other people in the department regard its reputation?

This measure of reputation (REPUT) was identified when Jones examined the ninety-eight items in the questionnaire (the Likert-type questions) by principal components analysis in order to confirm that the measures of reputation used in his study were independent of general job satisfaction and innovative climate. He found that

REPUT, consisting of five items, REP1, REP2, ORGN2, ORGN3 and WCON14, was clearly distinguishable and was confirmed as a coherent construct. It had an acceptable alpha coefficient (0.804); table 5.5 describes the five items. I decided to examine the same ninety-eight Likert-type items in the questionnaire in Bahrain by the technique of principal components analysis to see if a similarly coherent construct for reputation emerged. The following section discusses this in detail.

5.3.1 Principal Components Analysis

The technique of principle components analysis was used to examine the data in order to establish whether other item clusters might be found in Bahrain than in Britain in view of the different cultures. The ninety-eight items in the questionnaire which required a Likert-type response were examined by principal components analysis with a varimax rotation. But because the maximum iteration for convergence is 25, varimax rotation failed to converge after 25 iterations. Therefore, I selected the items that were identified as belonging to the factors. This subset of 61 items were then re-examined and the statistics were as follows: the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.8017, while the Bartlett test of sphericity (4857) was significant at the .0000 level.

Fifteen factors with an Eigen value greater than one were extracted and they accounted for a total variance of 76.2%. Varimax rotation confirmed that the fifteen factors were differentiated in terms of the items selected.

Table 5.6 Principal Components Analysis

Factors	1	2	
Supervisor's Administrative Handling	.786		
Supervisor's Technical Knowledge	.744		
Scientific Expertise (Supervisor)	.727		
Supervisor's Help to Plan	.724		
Friendly Supervisor	.665		
Opinion Before Decision Making	.656		
Quality of Supervision	.648		
Actual & Desired Autonomy	.588		
Participation in Decision Making	.552		
Reputation1		.809	
Reputation2		.810	
Productivity		.743	
Department's Image		.661	
Department's Morale		.603	
Orgn. Policies Consistency		.544	
Variance	**34%**	**6.9%**	

Factors	3	4	5
Job Variety	.826		
Job Skills	.805		
Personal Initiative & Judgement	.741		
Worth-while Achievement	.705		
Work Significance	.679		
Work Decisions Autonomy	.572		
Individual Development	.526		
Encouragement of Basic Assumptions About Science.		.717	
New Ideas		.664	
Encouragement to Exchange Ideas/Opinions		.624	
Team Work Encouragement		.593	
Dept's Flexibility		.530	
New Ways of Looking at Problems		.527	
Salary Satisfaction			.914
Comparative Salary			.880
Salary Scales Encouragement of Commitment			.787
Variance	**5.6%**	**3.8%**	**3.3%**

Cont'd Table 5.6 Principal Components Analysis

Factors	**6**	**7**	**8**
Exchanging Opinions/Ideas	.817		
New Ideas Solving Problems	.798		
People's Influence on Job Attitude	.592		
Prospect's Influence		.682	
Resources Influence		.523	
Ideas Assistance			.559
Career Opportunities			.499
Satisfied With Employer			.497
Variance	**3%**	**2.7%**	**2.7%**

Factor	**9**
Autonomy After 2 years	.716
Better/Worse Department	.586
Variance	**2.5%**

Table 5.6 shows only nine factors because one had a very low alpha (0.2768), which was heavily loaded on career fulfilment, and five factors included only one item each and so they were left out. Factor 1, which consisted of nine items, accounted for 34% of the variance and was heavily loaded on management style. Factor 2 consisted of six items, accounted for 6.9% of the variance and was heavily loaded on reputation. Factor 3 consisted of seven items and accounted for 5.6% of the variance and was heavily loaded on nature of work. Factor 4 consisted of six items with a variance of 3.8% and was heavily loaded on innovative climate. Factor 5 consisted of three items which accounted for 3.3% of the total variance and was heavily loaded on compensation. Factor 6 consisted of three items also and accounted for 3% of the variance and was heavily loaded on peer group. Factor 7 consisted of two items with

a variance of 2.7% and was heavily loaded on promotional opportunities. Factor 8 consisted of three items with a variance of 2.7% and was heavily loaded on working conditions. And factor nine consisted of two items with a variance of 2.5% and was heavily loaded on general job satisfaction.

Table 5.7 Comparing Constructs and Factors

Original Construct		Revised Factor	
Management Style	(MGT)	Management Style	(MGTSTYLE)
Innovative Climate	(INNO)	Innovative Climate	(INNOCLI)
Working Conditions	(WCON)	Working Conditions	(WKCON)
Peer Group	(PEER)	Peer Group	(PEERGROU)
Nature of Work	(WORK)	Nature of Work	(NATUWORK)
Promotional Opportunities	(PROM)	Promotional Opportunities	(PROMP)
Scientific and Academic Reputation	(ACADM)	—	
Satisfaction With Organisation	(SATIS)	—	
Compensation	(PAY)	Comparative Pay	(COMPY)
General Job Satisfaction	(JSAT)	General Job Satisfaction	(JOSAT)
Reputation	(REPUT)	Reputation	(REPUT2)

Table 5.7 compares the nine factors identified by principal components analysis with the original ten constructs discussed in chapter 4. ACADM and SATIS, which were constructed from ORGN by principal components analysis (Table 5.4), were not

represented in the revised factor structure. Reputation is represented in the revised factor structure as REPUT2 and consists of REP1, REP2, WCON12, WCON14, WCON19, and WCON20. That is, the perception of reputation is influenced, not only by whether the department is a good or bad place to work and by how most other people regard its reputation, but also by the organisational policies and the fairness of their application, by the department's image in the organisation, by the morale of the department and by its productivity.

Two factors i.e. ORGN2 and ORGN3, which are included in Jones's measure of reputation (REPUT) in Britain, are not included in the measure REPUT2 when the Bahraini data are examined. This may be attributed to the fact that the question of scientific and academic reputation are regarded less highly by research scientists in Bahrain as compared with more tangible issues such as working conditions, especially since scientific research is relatively new in Bahrain. The remaining constructs have their analogues in quite similar factors, although the numbers of items for some constructs are considerably reduced. For example, the construct WORK contains 15 items while NATUWORK contains only seven.

'Management style' formed nine items, which basically related to 'scientific and technical expertise'; 'human relations'; and 'participation style'. That is, the attitude to management was influenced by the perceived technical and scientific expertise of the supervisors and their human relations skills and style of management. The factors 'comparative pay' and 'PEERGROU' were extremely similar to the original constructs PAY and PEER. The factors related to innovatory climate (INNOCLI),

promotional opportunities (PROMP) and general job satisfaction (JOSAT) were formed entirely from items in the INNO, PROM and JSAT constructs. The construct JOSAT consisted of two items with a variance of 2.5% and to some extent was loaded on overall job satisfaction. Also, the reliability test has shown a lower coefficient value 0.6166. However, I have decided to include it in the analysis for two reasons: first, it is customary to use general job satisfaction as a construct in the studies of OB (Jones, 1992a). Secondly, the reliability of JOSAT is acceptable (McKennel, 1970, p236). The construct WCON was developed from items relating to conditions of work within the department and the individual items dealt with the physical work environment. To confirm the coherence of the principal components analysis they were checked for their reliability. The five main variables, REPUT2, INNOCLI, MGTSTYLE, NATUWORK and WKCON, had coefficient alphas of 0.8935, 0.8902, 0.9149, 0.8698 and 0.6772 respectively. The remaining variables also showed acceptable values for alpha: COMPY (0.8635), PEERGROU (0.7869) and PROMP (0.6539). This shows that the scales were highly reliable as each individual item contributed strongly to the alpha coefficient.

I suggest that REPUT2 as a measure of reputation represents the data on the Bahraini research scientists very well and provides a coherent construct since its reliability is very strong (0.8935). I will proceed on that basis.

5.4 REPUT2 as A Measure of Reputation

In the following sections the stages of analysis using REPUT2 as the measure of reputation are presented with a view to ultimately determining the factors that contribute most to internal reputation.

5.4.1 Correlation Coefficients

In this section it is intended to establish the nature of the relationships between the independent variables and the dependent variable, reputation (REPUT2). The first stage in the analysis involved the construction of the correlation matrix shown in Table 5.8.

Every relationship between the independent variables and the dependent variable was significant at .01. However, the correlation matrix also shows evidence of considerable multi-collinearity. Every variable which correlated with REPUT2 at a level greater than 0.50 had correlations with at least three other variables at that level or higher except for NATUWORK which correlated less than 0.50 with all the other independent variables. The correlation (0.4854, significant at 0.01) between NATUWORK and WKCON is worthy of note.

As can be seen from table 5.8 INNOCLI has the highest correlation with reputation, followed by MGTSTYLE, WKCON, JOSAT, PROMP, and NATUWORK. That is, good 'innovative climate', 'working conditions', 'general job satisfaction', 'promotional opportunities' and 'nature of work' have the strongest relationships with

a good internal reputation. COMPY and PEERGROU have weak relationships with reputation.

Table 5.8 Correlation Matrix (Revised Factors)

	REPUT2	INNOCLI	JOSAT	WKCON	NATUWORK	MGTSTYLE
REPUT2	1.0000	.6960**	.5703**	.5956**	.5109**	.6251**
INNOCLI	.6960**	1.0000	.5526**	.6611**	.4678**	.7847**
JOSAT	.5703**	.5526**	1.0000	.5170**	.4420**	.4980**
WKCON	.5956**	.6611**	.5170**	1.0000	.4854**	.5479**
NATUWORK	.5109**	.4678**	.4420**	.4854**	1.0000	.4169**
MGTSTYLE	.6251**	.7847**	.4980**	.5479**	.4169**	1.0000
PROMP	.5410**	.6008**	.5216**	.6129**	.3591**	.5448**
PEERGROU	.4350**	.5618**	.2742**	.5266**	.3105**	.4541**
COMPY	.2112**	.2619**	.2373**	.3204**	.0120	.2633**

	PROMP	PEERGROU	COMPY
REPUT2	.5410**	.4350**	.2112**
INNOCLI	.6008**	.5618**	.2619**
JOSAT	.5216**	.2742**	.2373**
WKCON	.6129**	.5266**	.3204**
NATUWORK	.3591**	.3105**	.0120
MGTSTYLE	.5448**	.4541**	.2633**
PROMP	1.0000	.4529**	.2425**
PEERGROU	.4529**	1.0000	.2395**
COMPY	.2425**	.2395**	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (1-tailed)

The correlations between INNOCLI and other independent variables are also strong. For instance, MGTSTYLE has a correlation of 0.7847 which shows the importance of the management style of the scientists, amongst other things, in establishing an innovative working climate. Also, WKCON and JOSAT have correlations with INNOCLI of 0.6611 and 0.5526 respectively, which tends to suggest that those

research scientists who enjoy high levels of innovative climate are satisfied with their working conditions and their jobs.

WKCON correlations with other independent variables are also strong. Management style has a correlation of 0.5479 which perhaps indicates the importance of the way in which research scientists are managed to their working conditions. Also JOSAT has a correlation of 0.5170 which shows that the research scientists who are satisfied with their jobs are happy with their working conditions. The correlations between PROMP and other independent variables are also strong, indicating that those research scientists who are satisfied with their jobs, working conditions, innovative climate and management style, are satisfied with their promotion opportunities.

I examine the relationship between the independent variables and reputation as a dependent variable (REPUT2) in greater detail in the following section.

5.4.2 Multiple Regression Analysis

The correlation coefficient 'r' indicates the nature of the relationship between two variables. The largest possible value for r is one, indicating a perfect correlation, and 0, indicating that there is no linear relationship. But it is possible for two values to have a strong relationship which is not linear. A strong positive correlation indicates that small values of X are associated with small values of Y, and large values of X are associated with large values of Y. In a negative relationship, small values of X are associated with large values of Y and large values of X with small values of Y.

Table 5.9 Multiple Regression - REPUT2

Multiple R	.74915
R Square	.56123
Adjusted R Square	.52049
Standard Error	.61377

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	13	67.46036	5.18926
Residual	140	52.74050	.37672

F = 13.77492 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
AGEDIS	-.059727	.073159	-.066860	-.816	.4157
COMPY	-.040359	.067083	-.038426	-.602	.5484
INNOCLI	.328763	.120164	.298217	2.736	.0070
JOSAT	.258835	.098395	.193191	2.631	.0095
MGTSTYLE	.178272	.101831	.163176	1.751	.0822
NATUWORK	.203263	.096500	.148777	2.106	.0370
NOEMP	-.038522	.065046	-.034701	-.592	.5547
PEERGROU	.004950	.097634	.003952	.051	.9596
PROMP	.065307	.083215	.063848	.785	.4339
QUALDIS	-.196002	.096428	-.131853	-2.033	.0440
SEX	-.044383	.110749	-.023523	-.401	.6892
TENDIS	.049004	.059814	.067629	.819	.4140
WKCON	.137893	.099649	.118609	1.384	.1686
(Constant)	.490153	.444015		1.104	.2715

Multiple regression examines the relationship between a number of independent variables and a dependent variable. For example, the correlation coefficient indicates the relationship between INNOCLI and REPUT2 when the two variables are used in isolation (There is a positive correlation of 0.6960). Regression analysis predicts the importance of each variable when all variables are in the equation. A large value for the regression coefficient (B) indicates the importance of the variable. Therefore, a large B for INNOCLI would confirm its importance as a determinant of reputation.

The data were examined by multiple regression analysis and the results are shown in Table 5.9. The multiple regression equation for REPUT2 is based on an analysis of thirteen independent variables: eight variables discussed previously and five personal characteristics, namely sex, educational qualification, age, tenure and number of employers.

On the basis of the work of Kennedy (1977) and Abratt (1989) the scientists' personal characteristics were expected to affect the process of reputation formation. They were included because it was assumed that reputation would vary with these characteristics. For example, it is expected that reputation would vary positively according to age and tenure, and negatively according to the number of previous employers; and that it would vary according to sex and educational qualifications, as was hypothesised in chapter 4. Table 5.9 shows the results after the examination of data by multiple regression: REPUT2 as the dependent variable and all the eight factors plus the five personal characteristics as the independent variables. As it can be seen from Table 5.9 the 'multiple regression' R of 74.9% equates to an R-squared of 56%. R-squared, the 'coefficient of multiple correlation' indicates the proportion of the squared error in the dependent variables which can be eliminated by using the equation (Norusis, 1986). R-squared does tend to 'overestimate' the relationship between the dependent and independent variables. The figure for 'adjusted' R-squared gives a more realistic estimate of the relationship. Adjusted R-squared is 'corrected' for the degrees of freedom and therefore takes account of the tendency for additional variables to inflate the value of R-squared, although, if an equation is based on a large number of observations R-squared and adjusted R-squared are usually very close (Watson,

Billingsley, Croft, and Huntsberger, 1990). This is nearly confirmed by Table 5.9 which shows a marginal downward adjustment of R-squared from 56% to an adjusted R-squared of 52%. Thirteen independent variables are used: the eight variables discussed previously and five personal characteristics- sex, educational qualifications, age, tenure and number of employers. The figure for adjusted R-squared indicates that 52% is the proportion of the variance of reputation accounted for by the thirteen variables. And that is normally regarded as acceptable. R-squared and adjusted R-squared are useful for indicating the strength of the association between the independent variables and the dependent variable. In addition to that multiple regression provides additional information regarding the relationships between the independent and the dependent variables. The value of B, the regression coefficient, indicates the relative importance of the independent variables as predictors of the dependent variable. The F statistic is valuable for establishing the statistical significance of a regression equation. It tests the null hypothesis that there is no linear relationship between the independent variables and the dependent variable. A large figure for F means that the null hypothesis should be rejected. The equation shown in Table 5.9 has a value for F of 13.775 significant at the 0.0000 level, which indicates that there is a linear relationship between the independent variables and the dependent variable.

The t-test can also be used in conjunction with the null hypothesis to establish whether or not an individual variable adds explanatory power to the equation. The null hypothesis states that the independent variable adds no greater explanatory power. But Watson et al (1990, p665/6) urge caution when interpreting the t-statistic:

"Failure to reject the null hypothesis would not allow us to conclude that X is unrelated to Y. It would allow us to conclude that there is not enough evidence to suggest that X is related to the prediction errors in Y after the contribution of the other independent variables to the predictions is considered." Alternatively, rejecting the null hypothesis suggests that an independent variable is related to the variation not explained by the remaining independent variables. The equation in Table 5.9 shows that the significance of the t-statistic is more than 0.05 for nine independent variables except for INNOCLI, JOSAT, NATUWORK and QUALDIS. Therefore, the null hypothesis cannot be rejected and these variables should not be included in the equation. However, it is necessary to examine the relationship between the independent and the dependent variables in a more formal manner. Stepwise analysis selects, according to certain criteria, the variable(s) with the highest 'explanatory power'.

5.4.3 Stepwise Analysis: REPUT2

Stepwise analysis of independent variables is probably the most commonly used method (Norusis, 1988, p48). Stepwise regression and selection identify subsets of variables that are good predictors of the dependent variable (Norusis, 1988, p45). The first independent variable considered for entry into the equation is the one with the largest positive or negative correlation with the dependent variable (REPUT2). Subsequent variables are chosen on the basis of the largest 'partial correlation', that is, the variable with the largest F value is entered into the equation. After each new addition, the variables in the equation are examined and removed if they fail to meet certain criteria.

Table 5.10 Stepwise Analysis - REPUT2

Multiple R	.73038
R Square	.53346
Adjusted R Square	.52093
Standard Error	.61349

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	64.12190	16.03047
Residual	149	56.07897	.37637

F = 42.59245 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
INNOCLI	.553902	.076325	.502438	7.257	.0000
JOSAT	.287387	.090414	.214501	3.179	.0018
NATUWORK	.262766	.088830	.192329	2.958	.0036
QUALDIS	-.203955	.086948	-.137203	-2.346	.0203
(Constant)	.460308	.320943		1.434	.1536

SPSS sets two criteria for the removal of variables: first, an F value less than the default of 2.71 and secondly, an F probability equal to or greater than 0.01 (Norusis, 1986, p226). The t-test is also a factor in the stepwise selection of variables. The null hypothesis states that adding a variable will not make a contribution to the explanatory power of the equation. Variables with a large value for t and a significance level less than 0.05 will make a contribution and are added to the equation. The stepwise analysis results are shown in table 5.10.

In the first step, innovative climate (INNOCLI) is entered into the equation since it has the largest positive correlation with REPUT2 and is the first independent variable to be entered. The figure for 'adjusted' R-squared was 0.4473; that is, 44.7% of the variance of REPUT2 was 'explained' by INNOCLI alone. This compares with 52% for all the thirteen variables included in the multiple regression equation. JOSAT is

entered into the equation as the second independent variable and accounts for 4.2% of the variance. The final equation contains two more variables; NATUWORK and QUALDIS. The nine variables not included are those which had a significance level of more than 0.05 in the multiple regression (Table 5.9).

Table 5.11 Change in Adjusted R-Squared - REPUT2

INNOCLI	0.4473	44.7%
JOSAT	0.0422	4.2%
NATUWORK	0.0170	1.7%
QUALDIS	0.0144	1.4%
.	0.5209	52%

Table 5.11 shows the change in adjusted R-squared after each of the four variables included in the stepwise analysis final equation is entered. The change in adjusted R-squared gives an indication of how much effect the entry of each variable has on the explanatory power of the equation. INNOCLI alone accounts for 44.7% of the variance. JOSAT is entered into the equation as the second main variable and accounts for 4.2% of the variance. NATUWORK and QUALDIS together account for 3.1% of the variance.

To check the selection criteria of the stepwise method it was considered useful to establish whether the same equation would be produced using different default criteria. 'Forward selection' was chosen. Norusis (1988, p48) says that if stepwise selection with the default criteria results in the same equation as was produced by

forward selection then one should be encouraged. 'Forward selection' chooses the independent variable with the largest correlation as the first entry into the equation. The remaining variables are then selected on the basis of which has the largest partial correlation with the dependent variable, that is, the largest F value. An F probability of 0.05 or less (Norusis, 1986) is the criterion for entry, corresponding to a default value of 3.84.

Table 5.12 Forward Selection - REPUT2

```
Multiple R            .73038
R Square              .53346
Adjusted R Square     .52093
Standard Error        .61349

Analysis of Variance
                    DF        Sum of Squares      Mean Square
Regression           4             64.12190         16.03047
Residual           149             56.07897           .37637

F =       42.59245       Signif F =  .0000

---------------- Variables in the Equation -----------------

Variable              B         SE B       Beta         T  Sig T

INNOCLI          .553902      .076325     .502438     7.257  .0000
JOSAT            .287387      .090414     .214501     3.179  .0018
NATUWORK         .262766      .088830     .192329     2.958  .0036
QUALDIS         -.203955      .086948    -.137203    -2.346  .0203
(Constant)       .460308      .320943                 1.434  .1536
```

Forward selection confirmed the stepwise equation, choosing the same four variables in the same order, that is, INNOCLI, JOSAT, NATUWORK and QUALDIS with a final F statistic of 42.59 significant at the 0.0000 level (Table 5.12).

5.5 REPUT2 and the Original Constructs

To complete this chapter I will construct an equation using the construct REPUT2 as a dependent variable and the original ten variables as independent variables. I decided to use the original constructs and not simply proceed with the constructs identified by factor analysis in the previous section for two reasons. First, the original constructs were based on proven scales which have been examined before (Jones, 1992a); and these constructs were shown to be highly reliable in terms of the Bahrain data. They exhibited coefficient alpha values above 0.8 for almost all the original constructs: INNO (0.8316), WCON (0.8594), WORK (0.8134), MGT (0.9110), JSAT (0.8152), PROM (0.7599), PEER (0.8383) and PAY (0.8584). Those constructs contained most of their items. For example WCON contains 20 items compared with three items within the WKCON factor and MGT contained 17 items compared with nine within the MGTSTYLE factor and this is the case with all the other constructs. Secondly, it was thought that the original constructs might provide a better explanation for reputation. And it is interesting and worthwhile to see whether the original constructs confirm the determinants of reputation identified by the variables revised by factor analysis.

Therefore, in this section I use multiple regression analysis to examine the ten original constructs plus the five personal characteristics: sex, age, educational qualification, tenure and number of employers. The construct REPUT2 contained, in addition to REP1 and REP2, four items from the WCON construct i.e. WCON12, WCON14, WCON19 and WCON20. Therefore these four items were removed from the WCON

construct, which then comprised 16 items. Testing its consistency produced an alpha value of 0.7845, which is regarded as satisfactory.

Table 5.13 Correlation Coefficients Matrix - REPUT2

	REPUT2	INNO	JSAT	WCON	WORK	MGT
REPUT2	1.0000	.7426**	.6727**	.7081**	.5631**	.6361**
INNO	.7426**	1.0000	.6514**	.8067**	.6513**	.7739**
JSAT	.6727**	.6514**	1.0000	.7059**	.5249**	.5351**
WCON	.7081**	.8067**	.7059**	1.0000	.5757**	.7024**
WORK	.5631**	.6513**	.5249**	.5757**	1.0000	.5525**
MGT	.6361**	.7739**	.5351**	.7024**	.5525**	1.0000
PROM	.6428**	.6792**	.6037**	.6352**	.6397**	.6079**
PEER	.4149**	.4906**	.4309**	.5549**	.3418**	.4612**
ACADM	.6621**	.6424**	.5957**	.6445**	.5958**	.5694**
SATIS	.4239**	.4090**	.3887**	.4076**	.4925**	.3193**
PAY	.2265**	.3009**	.3941**	.3620**	.1183	.2565**

	PROM	PEER	ACADM	SATIS	PAY
REPUT2	.6428**	.4149**	.6621**	.4239**	.2265**
INNO	.6792**	.4906**	.6424**	.4090**	.3009**
JSAT	.6037**	.4309**	.5957**	.3887**	.3941**
WCON	.6352**	.5549**	.6445**	.4076**	.3620**
WORK	.6397**	.3418**	.5958**	.4925**	.1183
MGT	.6079**	.4612**	.5694**	.3193**	.2565**
PROM	1.0000	.3950**	.5589**	.4515**	.3315**
PEER	.3950**	1.0000	.4993**	.2622**	.2479**
ACADM	.5589**	.4993**	1.0000	.3111**	.2062**
SATIS	.4515**	.2622**	.3111**	1.0000	.1270
PAY	.3315**	.2479**	.2062**	.1270	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (1-tailed)

A correlation coefficients matrix was then constructed and produced correlations very close to those of the revised factor matrix. As table 5.13 shows, REPUT2 correlates strongly with WCON, INNO, JSAT, MGT, WORK, PROM and ACADM and weakly with PAY, PEER and SATIS. It also exhibits a number of variables that are highly

inter-correlated. WCON has the highest correlation with INNO (0.8067), which suggests that those research scientists who enjoy high levels of innovative climate are extremely satisfied with their working conditions. WCON is also highly correlated to JSAT (0.7059), suggesting that those scientists who are satisfied with their jobs are highly satisfied with their working conditions too. Also WCON is highly correlated to MGT (0.7024), which could mean that those scientists who are happy with the supervision they experience are satisfied with their working conditions. This seems also to be the case with WORK (0.5757), PEER (0.5549), PROM (0.6352) and ACADM (0.6445).

INNO's correlations with other independent variables are also very strong. MGT has a correlation of 0.7739, suggesting that management style is important in improving research scientists' innovative climate. Other independent variables JSAT (0.6514), WORK (0.6513), PROM (0.6792) and ACADM (0.6424) correlate well. Even PEER (0.4906) is worth noting; it suggests that establishing an innovative climate by encouraging team work and the exchange of ideas and opinions amongst research scientists, is deemed important by them. JSAT, MGT, WORK, PROM and ACADM also have strong correlations with almost the same variables that have strong correlations with WCON and INNO.

Multiple regression was employed to examine the data, using REPUT2 as a dependent variable and the original constructs plus the five personal characteristics as the independent variables. Table 5.14 shows that the adjusted R-squared for the ten

variables in addition to the five personal characteristics was higher than that for REPUT2 with the revised factors, 62% as against 52%.

Table 5.14 Multiple Regression - REPUT2

```
Multiple R            .81320
R Square              .66130
Adjusted R Square     .62191
Standard Error        .53997

Analysis of Variance
                    DF        Sum of Squares      Mean Square
Regression          15              73.43628          4.89575
Residual           129              37.61274           .29157

F =      16.79091       Signif F =  .0000

----------------- Variables in the Equation -----------------

Variable             B         SE B       Beta         T  Sig T

AGEDIS         -.080009      .067436   -.090210    -1.186  .2376
MGT             .183056      .107269    .147590     1.707  .0903
NOEMP          -.023735      .058848   -.021623     -.403  .6874
PAY            -.100682      .073098   -.082568    -1.377  .1708
PEER           -.087479      .095017   -.064000     -.921  .3589
PROM            .067130      .117696    .047977      .570  .5694
QUALDIS        -.116755      .087140   -.078257    -1.340  .1826
SATIS           .143419      .079549    .107464     1.803  .0737
SEX             .043204      .101189    .023232      .427  .6701
WORK           -.203248      .138683   -.116977    -1.466  .1452
TENDIS          .053292      .054614    .075577      .976  .3310
INNO            .351022      .146646    .250814     2.394  .0181
JSAT            .226729      .075079    .237884     3.020  .0030
ACADM           .235743      .088257    .204773     2.671  .0085
WCON            .346989      .180018    .190780     1.928  .0561
(Constant)      .200896      .464984                .432  .6664
```

Stepwise analysis was used to identify the variables which did most to explain the variance of REPUT2 by the original constructs. INNO was entered first into the equation and the adjusted R-squared was 51.4% of the variance. JSAT was the second variable entered into the equation and accounted for 6.9% of the variance.

ACADM and WCON were then entered into the equation and contributed 2.3% and 1% respectively.

Table 5. 15 Stepwise Analysis - REPUT2

Multiple R	.79198
R Square	.62723
Adjusted R Square	.61657
Standard Error	.54377

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	69.65277	17.41319
Residual	140	41.39624	.29569

F = 58.89055 Signif F = .0000

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
INNO	.416513	.124529	.297608	3.345	.0011
JSAT	.212873	.071596	.223346	2.973	.0035
ACADM	.213187	.081182	.185180	2.626	.0096
WCON	.375985	.170770	.206722	2.202	.0293
(Constant)	-.223689	.317357		-.705	.4821

Table 5.15 shows the final stepwise equation in which INNO, JSAT, ACADM and WCON are the main determinants of reputation. Innovative climate (INNOCLI) and general job satisfaction (JOSAT) were also the main determinants of reputation for the revised factors and accounted for 44.7% and 4.2% of the variance respectively. This suggests that REPUT2 provides a more comprehensive explanation of internal reputation and the hypotheses that innovative climate and general job satisfaction would be the main determinants of reputation are confirmed. Forward selection confirmed the stepwise equation by choosing the same four variables in the same order i.e. INNO, JSAT, ACADM and WCON.

5.6 Alternative Dependent Variables

There were five independent variables which strongly inter-correlated with one another: WCON, INNO, JSAT, MGT and WORK. Therefore it was decided to investigate whether the data gave a better explanation of them than for REPUT2.

Table 5.16 Alternative Dependent Variables

Dependent Variable	R-Squared	Adjusted R-Squared
Innovative Climate (INNO)	77%	74%
Working Conditions (WCON)	74%	71%
Management Style (MGT)	66%	62%
General Job Satisfaction (JSAT)	60%	56%
Nature of Work (WORK)	59%	55%

Five multiple regression equations were constructed using working conditions, innovative climate, general job satisfaction, management style and nature of work as the dependent variables (WCON, INNO, JSAT, MGT and WORK). The figures for R-squared and adjusted R-squared for each equation are shown in Table 5.16. Table 5.16 shows some variations in the values of R-squared and adjusted R-squared. The independent variables explained 74% of the variance of INNO compared with 71% of WCON, 62% of MGT, 56% of JSAT and 55% of WORK. The independent variables provided a better explanation for innovative climate and working conditions than for general job satisfaction and nature of work compared with REPUT2. However, in the case of management style they provided the same explanation as that for REPUT2 i.e.

62% for adjusted R-squared. Therefore, I suggest that the data provide a reasonable level of explanation for the independent variables that are hypothesised to be most important in determining internal reputation.

5.6.1 Stepwise Analysis

In an attempt to identify the main explanatory variables, each dependent variable was examined using stepwise analysis. Table 5.17 summarises the results for the five equations.

Table 5.17 Stepwise Equations

INNO (Innovative Climate)

	Change in Adjusted R-Squared
WCON	62.9%
MGT	9.3%
WORK	1.9%
REPUT2	1.4%
	74% Adjusted R-Squared

MGT (Management Style

	Change in Adjusted R-Squared
INNO	59.2%
PROM	2.5%
	62% Adjusted R-Squared

Cont'd Table 5.17 Stepwise Equations

WCON (Working Conditions)

	Change in Adjusted R-Squared
INNO	63%
JSAT	5%
PEER	2.1%
REPUT2	1%
	71% Adjusted R-Squared

JSAT (General Job Satisfaction

	Change in Adjusted R-Squared
WCON	47%
REPUT2	5.9%
PAY	1.9%
ACADM	1%
	56% Adjusted R-Squared

WORK (Nature of Work)

	Change in Adjusted R-Squared
INNO	39.5%
ACADM	5.5%
SATIS	4.7%
QUALDIS	3.6%
	55% Adjusted R-Squared

INNO was the main explanator for WCON, MGT and WORK, accounting for 63%, 59.2% and 39.5% of the variance respectively. WCON was the main explanator for INNO and JSAT, accounting for 62.9% and 47% of the variance. JSAT was the

second main explanator for WCON, accounting for 5%. MGT was the second main explanator for INNO, accounting for 9.3% of the variance. Reputation (REPUT2) was the second main explanator for JSAT and the fourth explanator for WCON and INNO, accounting for 5.9%, 1% and 1.4% of the variance. WORK was the third explanator for INNO, accounting for 1.9% of the variance. ACADM and SATIS were the second and third for WORK, accounting for 5.5% and 4.7% respectively. Therefore, according to this model, INNO, MGT, WCON, JSAT, WORK and REPUT2 are highly explanatory of one another and very closely linked.

5.7 Indirect Determinants of REPUT2

It was hypothesised that WCON, INNO and JSAT were the main determinants of reputation in addition to those suggested by Jones (1992a), namely WORK and MGT. Since INNO and JSAT have been confirmed as the main determinants of reputation, multiple regression was used to identify the variables that provided the best explanation of INNO and JSAT, as was shown in the previous section in table 5.17. This is highlighted in table 5.18. As can be seen, WCON is the main explanator for INNO and JSAT, accounting for 62.9% and 47% of the variance respectively. MGT is the second main explanatory for INNO, accounting for 9.3% of the variance. This indicates the importance of management style in establishing an innovative climate. Therefore, it appears reasonable to suggest that WCON and MGT are the variables that affect REPUT2 indirectly. However, in order to establish the causal relationships between the independent variables, as demonstrated by stepwise analysis, I propose to use the technique of path analysis. This will be dealt with in the discussion chapter (Chapter 7).

Table 5.18 Alternative Dependent Variables

Dependent Variable - INNO

WCON	62.9%
MGT	9.3%
WORK	1.9%
REPUT2	1.4%

R-Squared = 77%
Adjusted R-Squared = 74%

Dependent Variable - JSAT

WCON	47%
REPUT2	5.9%
PAY	1.9%
ACADM	1%

R-Squared = 60.5%
Adjusted R-Squared = 56%

5.8 Summary

In the first section of the chapter each of the nine variables was analysed for its 'internal consistency' or reliability. One variable, ORGN, was subsequently examined using factor analysis. ORGN was replaced by two factors, ACADM and SATIS. Therefore, the analysis proceeded with ten variables rather than the original nine.

In the second section the ninety-eight Likert-type items in the questionnaire were examined because it was thought that a different 'cluster' might form for reputation than did for Jones in Britain, because of the difference of culture. This proved to be

right; a new cluster of items for reputation formed, which was designated REPUT2. The coherence of this construct was confirmed the reliability test (alpha of 0.8935).

Two correlation matrices were constructed for the revised factors, identified by factor analysis, and for the original constructs. These confirmed that almost every correlation was statistically significant; working conditions, innovative climate, general job satisfaction, managerial style and nature of work correlated highly with reputation. However, there was also evidence of considerable multi-collinearity. That is, most of the variables were strongly correlated with other variables. Working conditions, innovative climate, general job satisfaction and managerial style had the highest inter-correlation; and promotional opportunities had substantial correlations with the other independent variables.

Two regression equations were then constructed to examine the data using reputation (REPUT2) as the dependent variable and the revised factors and the original constructs as the independent variables. The regression equations showed an adjusted R-squared of 52% and 62% for REPUT2. The regression coefficient (B) identified innovative climate and general job satisfaction as the variables which made the largest contribution to the explanation of reputation in both equations, thus confirming my hypotheses that innovative climate and general job satisfaction would be the main determinants of reputation.

Stepwise analysis confirmed innovative climate and general job satisfaction as the main explanatory variables, contributing 44.7% and 4.2% to the variance of REPUT2

for the revised factors and 51.4% and 6.9% of the variance for the original constructs. The significant multi-collinearity observed in the correlation matrices amongst the five main constructs (working conditions, innovative climate, general job satisfaction, nature of work and management style) led me to examine those five constructs, by multiple regression, treating them as the dependent variables. Five equations resulted. The independent variables provided better explanation for INNO and WCON than for JSAT and WORK. However, MGT produced the same adjusted R-squared as REPUT2 (62%). Stepwise analysis was then used to identify the main explanatory of those five dependent variables, which showed that they were highly explanatory of one another. Stepwise analysis identified working conditions as the main explanator of innovative climate and general job satisfaction, accounting for 62.9% and 47% respectively. Management style was the second main explanator of innovative climate, accounting for 9.3% of the variance. This indicates that WCON and MGT affect internal reputation through INNO and JSAT. This will be further investigated by the technique of path analysis in Chapter 7.

Innovative climate and general job satisfaction were found to be the main determinants of internal reputation, in the case both of the revised factors and of the original constructs. Working conditions and management style were identified as the main determinants of innovative climate and general job satisfaction. Therefore it is suggested that they will have an indirect effect on internal reputation.

Chapter Six

Reputation and Social Groups

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Chapter Six

Reputation and Social Groups

DATA ANALYSIS II

In this chapter I examine the attitudes to internal reputation of the social groups as defined by age, length of service (tenure), the number of previous employers (NOEMP), sex, educational qualifications (QUALDIS) and field of specialisation (specialisation). There are two reasons for this. First, the literature claims that there are differences related to social group. For example Pelz and Andrews (1976) identified clear differences in the motivation of PhDs and non-PhDs. Goldberg and Kirschenbaum (1988) found that older employees displayed higher levels of organisational commitment than younger employees. Toren and King (1982) identified differences in the orientation of PhDs and non-PhDs related to socialisation during the course of doctoral study. Secondly, the number of MSc and PhD holders in Bahrain has increased over the last ten years by about 600% (Statistical Abstract, 1992) and they constitute a sizeable proportion of the work force in the universities and other organisations. In examining differences in perceptions of reputation according to educational level I am hoping to extend the findings of the present study to Bahraini scientists in general. The same argument can be applied to sex. In Bahrain at one time it was very strange and contrary to the culture of the country to see women at work. Over the past three decades or so it has become normal to see women at work. In 1991 (Statistical Abstract, 1992) females represented about 45% of the total qualified population of Bahrain. The work force in Bahrain includes a

high percentage of women, about 28%. The sample used for the present study included 33% women and, I assumed that male and female would differ in their perceptions of reputation. A number of propositions were included in the study in relation to social differences, one of which was that reputation would vary according to those differences: not only of sex but also of age, tenure, number of employers, qualification and field of specialisation. The technique of analysis of variance (ANOVA), explained in the following section, was used to establish statistically significant differences among the groups and to test the above hypothesis.

6.1 Analysis of Variance: Justification and Description

In order to draw inferences about the varying responses of each social group, a statistical technique which can compare the means of the responses for each group and show if there are any significant difference among them, is required. One technique would, perhaps, be to conduct a series of t-tests comparing each group with the others: in the case of age group1 with group2, 1 with 3, and 2 with 3). However, this would not be very efficient. Making all possible comparisons among 10 cases would, for example, require 45 t-tests. More serious than this is the risk of making type (I) error. Suppose alpha (the probability) is set at 0.05 for rejecting the null hypothesis; Ho: $\mu A = \mu B = \mu C$ in any individual t-test (i.e. we reject the null hypothesis that the means of any two groups are equal when P = 0.05). In such a situation there is a probability of 0.05 of making a type (I) error when comparing any two means. This signifies that we would expect to make a type (I) error about once in 20 t-tests. If we compared all possible means for 10 groups (45 t-tests), we would expect a type (I) error to occur

about twice, causing us to reject incorrectly the null hypothesis that all of the group means are equal.

One technique designed to overcome this problem is analysis of variance (ANOVA) which is one of the most versatile and useful techniques of statistical inference. Basically, ANOVA partitions the variance in a set of data into several components in such a way that the contribution of each of these components to the overall data may be assessed. In other words, the ANOVA technique addresses questions of statistical significance through calculation methods which divide overall variance into components. The calculation method uses techniques involving the 'sums of squares'. Generally, the following parameters are calculated in one-way ANOVA: the total sums of squares, sums of squares among groups, and residual sums of squares. When each sum of squares is divided by its associated degrees of freedom a value called "mean squares" results. ANOVA also requires calculation of a parameter called the F-ratio. This is obtained by dividing the mean square among groups by the mean square. Before the use of computers for obtaining P-value, one would consult a table to locate the P-value associated with a specific combination of F, degrees of freedom for groups, and degrees of freedom for the error term.

ANOVA is a statistical technique specially designed to test whether the means of more than two populations are equal; sample evidence can be employed to draw inferences about population means. An independent simple random sample is taken from each of several populations that are assumed to be normally distributed and to have identical variances. The analysis-of-variance test is quite robust with respect to

the normality assumption (even moderate departures from this assumption do not change the results much). But any violation of the equal - variances assumption seriously affects the validity of the test (Kohler, 1984). An example to illustrate the method is presented in appendix 7.

Scheffe Test

The Scheffe test is one of the tests that produce multiple comparisons between groups. It has been used in the computer version of the ANOVA in the present research to confirm significant differences between groups. On the Scheffe test Vogt (1993, p204) says "it is a test of statistical significance used for post hoc multiple analysis or an ANOVA." He comments on its main features as that it is a conservative test in that it tends to underestimate significance and that it deals well with unequal cell sizes.

6.2 The Revised Factors

In this section the responses of the various biographical groups will be examined to the nine factors identified by principal components analysis, i.e. REPUT2, INNOCLI, WKCON, MGTSTYLE, NATUWORK, JOSAT, PROMP, PEERGROU and COMPY.

6.2.1 Age, Tenure and Number of Employers

One objective of the research is to compare differences between the expectations of potential employees with the actual conditions of scientists working in research organisations. It is assumed that reputation will tend to vary with age. In order to examine this proposition i.e. that older research scientists rate reputation higher than

younger ones, the sample was rearranged from the original five groups of five into three approximately equal-sized groups. Group1 were the research scientists who were less than 30 years of age, Group2, those who were aged 30 to 35 and Group3, those who were over 35 years of age.

It was also assumed that length of service (tenure) in the organisation would be proportional to the reputation, i.e. that the longer-serving research scientists would rate reputation higher than those who had worked for less time. However, there might be differences according to whether or not the individual had had experience in other organisations. Consequently, the results for 'age' and 'tenure' might not be entirely consistent. Nevertheless, I expected satisfaction with an organisation, expressed in terms of a rating for reputation, to increase with length of service. Therefore, the largest variation should be between groups 1 and 3. The sample was divided into three groups: Group1, those with service of 1-10 years (38%), Group2 those with 11-15 years service (32%), and Group3, those with 16 years service (30%).

As for the number of previous employers, the sample was divided, again, into three groups. Group1 consisted of research scientists who had worked with the present employer only (29%). Group2 consisted of those with one previous employer (35%). And Group3 consisted of those who had worked for three or more employers (36%). I expected to find some variation between those without previous employment experience and those who had had one or more previous employers. Previous experience could act in at least two ways. Good early work experience could accentuate the negative aspects of the existing employment relationship. Equally,

unsatisfactory early work experience could emphasise the positive aspects of the current relationship. On balance it was to be expected that reputation would be negatively related to the number of employers; and that the independent variables that would be linked to a low reputation for those with previous employment experience, would be pay, promotion opportunities and management style. To summarise, these are the hypotheses:

a) The older research scientists will rate reputation higher than their younger colleagues.

b) The longer-serving scientists will rate reputation higher than those who have been working for a shorter time..

c) Reputation will be negatively related to the number of employers scientists have had.

d) The independent variables that will be linked to low reputation for those with previous employment experience will be PAY, PROM and MGT.

Table 6.1 Group Means for REPUT2

	(Means)		
Factor	**Group1**	**Group2**	**Group3**
AGEDIS	3.8712	3.8147	3.7948
TENDIS	3.7574	3.894	3.8212
NOEMP	3.8596	3.7216	3.8720

Table 6.1 shows the groups' means rating for reputation, by age (AGEDIS), length of service (TENURE), and number of previous employers (NOEMP). The proposition

that reputation would be higher for older employees was not substantiated. Group1 (under 30 years of age) had a mean of 3.8712 for REPUT2, Group2 (30-35 years of age) had a mean of 3.8147 and Group3 (over 35 years of age) one of 3.7948.

As regards tenure, Group1, those with 1-10 years service, had a mean of 3.7574 for REPUT2, Group2, those with 11-15 years service had a mean 3.8940 and Group3, those with 16 years service and more, one of 3.8212. Again, the proposition that the longer-serving employees would rate reputation higher was not substantiated. The variations, as in the case of age, were not significantly different in statistical terms.

Table 6.2 Group Means by NOEMP

	(Means)			
Variable	**Group1**	**Group2**	**Group3**	**Signif**
REPUT2	3.8596	3.7216	3.8720	0.6290
COMPY	2.7270	2.5060	2.7345	0.2883
MGTSTYLE	3.1844	3.3501	3.4113	0.3603
PROMP	3.0532	3.2768	3.2797	0.3501

As regards the number of previous employers, table 6.2 shows that Groups 1 and 3, i.e. those with one or three employers and more, scored slightly higher means for reputation than Group2, those with two employers. However, these differences are not significant. Therefore the proposition that reputation would vary negatively with the number of employers was not substantiated.

There were no statistically significant differences between independent variables, whether research scientists were with their first, second or third employer or more. As for the proposition that the independent variables that would be linked with low reputation for those with previous employment experience, would be COMPY, PROMP and MGTSTYLE, this too was not substantiated (see Table 6.2).

In summary the analysis of variance showed that the different age groups' perceptions of reputation were not significantly different. Thus the proposition that older research scientists would rate reputation higher was not supported. The same goes for tenure: the proposition that longer serving research scientists would rate reputation higher was not supported. Nor did reputation prove to be negatively related to the number of employers a scientist had had. No independent variable was found to be significantly different by reason of differences of age, tenure or number of previous employers.

6.2.2 Educational Qualifications and Field of Specialisation

The revised factors were examined by analysis of variance to establish whether there were significant statistical differences related to educational qualifications and field of specialisation. Pelz and Andrews (1976) found distinct differences between R&D employees with a PhD and those with a Bachelor's degree. PhDs were noticeably different in their motivation and in the quality and quantity of their scientific output. These differences were based on the attitudes of PhDs to the amount of autonomy they were given to communication strategies, and to diversity of work. Also, the literature indicates considerably less identification with their organisation amongst professional than non-professional employees (Raelin, 1985 and 1991), although there

are some who believe that such differences have been overstated (Guy, 1985). Nevertheless, the idea that professionals in organisations have a distinct set of values and orientations is extremely pervasive. If differences do exist they should be clearly reflected in attitudes to reputation.

Independent variables should reflect such differences. For instance, highly qualified research scientists should have less interest in 'extrinsic' factors such as remuneration (PAY). It also appears likely that WORK will be rated higher by a PhD research scientist than by a BSc or MSc, although in Jones's (1992a) study the data failed to substantiate this proposition. However, I base my assumption on the fact that scientific research in Bahrain is relatively new and is looked on as a highly prestigious profession; research scientists in Bahrain derive immense intrinsic and extrinsic satisfaction from their work. They generally attach great value to their work and again satisfaction from being involved in the scientific process (Waneta, 1987). Therefore the type of work that they do will be challenging and demanding, this leading to the self-actualisation, sense of achievement, and self-esteem that are sought by PhDs more than they are by BScs, who may be presumed to be more interested in extrinsic factors such as pay and promotion.

In summary, therefore my hypotheses were:

a) The higher qualified scientists would rate reputation lower than the less qualified ones;

b) PhD research scientists would rate 'extrinsic' factors, such as PAY higher than BScs;

c) The PhDs would rate WORK higher than BScs or MScs;

d) There would be variations in the rating of reputation between natural scientists and social scientists.

The sample was divided into three groups in terms of qualification: research scientists with a BSc numbered 109 and made up 67% of the sample; those with an MSc numbered 43 and made up 26%; and only nine or 6% had a PhD. From the point of view of specialisation the sample was divided into two groups: Group1, those who specialised in natural science totalled 67 or 41% of the sample, and Group2, those who specialised in social sciences totalled 50 or 31%. 28% of the research scientists did not give their field of specialisation. The groups mean scores for reputation are shown in table 6.3.

Table 6.3 shows the difference between the groups for QUALDIS. The results do not support the proposition that research scientists with a PhD would rate reputation lower than those with a BSc. Also, as can be seen from the table, the difference between the natural and social scientists is not statistically significant.

Table 6.3 Group Means for REPUT2 by QUALDIS and Specialisation

	(Means)			
Factor	**Group1**	**Group2**	**Group3**	**Signif**
QUALDIS	3.7740	3.8814	3.8389	0.8029
Specialisation	3.8303	3.8317	—	0.9937

ANOVA identified two variables, nature of work (NATUWORK) and comparative pay (COMPY), as showing significant differences for those with different educational qualifications. As can be seen from table 6.4, NATUWORK was rated highest by Group3 (PhD holders), followed by Group2 (MSc holders) and Group1 (BSc holders). The Scheffe test confirmed that there was a significant difference between Groups 1 and 3. The results confirm the earlier proposition that the more highly-qualified research scientists are more satisfied with their work than the less qualified (BSc holders). Professionals in organisations desire considerable autonomy and expect their work to be interesting and challenging.

Table 6.4 Variables Significant by Educational Qualification

	(Means)			
Variable	**Group1**	**Group2**	**Group3**	**Signif**
NATUWORK	3.5027	3.8034	4.1190	0.0031
COMPY	2.7508	2.4762	2.0000	0.0129

The other independent variable, COMPY, was rated highest by the research scientists with a BSc followed by those with an MSc and was rated lowest by the PhDs. PhD holders were the least satisfied with their remuneration. This can be attributed to the fact that PhD holders must maintain a certain standard of living in society. This however, is to suggest that relative levels of satisfaction and dissatisfaction with pay may have more to do with external than work-related factors (Jones, 1992a). The

result does not confirm the proposition that PhDs would prove to be less interested in extrinsic factors such as pay.

Table 6.5 Group Means by Specialisation

	(Means)		
Variable	**Group1**	**Group2**	**Signif**
INNOCLI	3.1415	3.1527	0.9413
JOSAT	3.3358	3.2000	0.2639
WKCON	2.9726	3.1033	0.3567
NATUWORK	3.6759	3.6254	0.6853
MGTSTYLE	3.3771	3.3125	0.6717
PEERGROU	3.3955	3.5510	0.2588
PROMP	3.2015	3.2551	0.7548
COMPY	2.5796	2.5102	0.6702

As for the field of specialisation i.e. those who specialised in the natural sciences as opposed to those who specialised in social science, the analysis of variance (ANOVA) did not identify any variable which was significantly different. Table 6.5 shows that the differences between the ratings for Group1 and Group2 are not significant.

6.2.3 Male and Female

It was hypothesised that there would be differences between male and female research scientists. Any such differences should emerge from their responses on reputation, nature of work and promotion opportunities. The underlying assumption was that women would show themselves to be less committed research scientists for family reasons and might have to be content with more lowly tasks. Also, women would view their promotion prospects more pessimistically.

Table 6.6 Group Means for REPUT2 by Sex

	(Means)		
Variable	Group1	Group2	Signif
SEX	3.8428	3.7614	0.5941

Table 6.6 shows that the groups' mean rating for reputation (REPUT2) did not vary significantly. The male group scored 3.8428 on reputation and the female group 3.7614. The proposition that there would be a variation in the rating of reputation between males and females was thus not supported.

Table 6.7 Variables Significant by Sex

	(Means)		
Variable	Group1	Group2	Signif
COMPY	2.7469	2.4660	0.0504

The analysis of variance did show COMPY to be significantly different for the two sexes (Table 6.7). The women rated COMPY significantly lower than men and expressed dissatisfaction with their remuneration. Forty one (41) out of a total of 53 females in the sample were married women with children and presumably needed more money to help support their families.

Table 6.8 Means for Men's and Women's Groups

	(Means)		
Variable	**Group1**	**Group2**	**Signif**
INNOCLI	3.1862	3.0386	0.2776
JOSAT	3.2844	3.2870	0.9817
MGTSTYLE	3.3612	3.2503	0.4216
NATUWORK	3.6575	3.5403	0.2987
PEERGROU	3.5123	3.4198	0.4322
PROMP	3.2130	3.2130	1.0000
WKCON	3.0856	2.9352	0.2460

Table 6.8 shows the men's and women's groups' means for the independent variables. The difference in rating between male and female for NATUWORK is insignificant, men (Group1) scoring slightly higher - 3.6575 compared to 3.5403 for women. The proposition that women would rate work lower than men and settle for less important tasks was thus not substantiated. The same can be said of the rating for PROMP, although the identical scoring may be an indication that the two groups were equally negative about their promotion opportunities (Jones, 1992a).

In this section I have compared the ratings of the social groups for the nine factors identified by principal components analysis. The propositions that older, longer-serving research scientists would rate reputation higher than younger ones with less service were not supported. The proposition that the number of employers scientist had had would be negatively related to reputation was also not substantiated. There were marginal differences between the groups. The mean scores for reputation of the

more qualified research scientists (PhD) was not different from those of the less-qualified (BSc). Therefore the proposition that PhD scientists would rate reputation lower than those with a BSc was not supported. The mean score for NATUWORK of PhDs and BScs was significantly different. Group3 (PhDs) rated NATUWORK significantly higher than Group1 (BScs), so the proposition that PhDs would rate the nature of the work higher than the BScs was substantiated. However COMPY was rated significantly lower by PhDs than by BScs. Therefore, the proposition that PhDs would be less interested in 'extrinsic' factors was not supported as far as remuneration was concerned.

The rating of reputation between males and females were not significantly different. Therefore the proposition that there would be variations in the rating of reputation between the male and female groups was not substantiated. The propositions that women would be more content with mundane tasks and would be less concerned about their promotion opportunities than men were not substantiated. One independent variable, COMPY, was identified as revealing a significant difference between men and women. Women rated COMPY lower than men.

6.3 The Original Constructs

In this section I compare the social groups in terms of their ratings of the original ten constructs, i.e. INNO, WCON, MGT, WORK, JSAT, PROM, PEER, PAY, ACADM and SATIS. The groupings are the same as those used in the previous sections.

6.3.1 Age, Tenure and Number of Employers

Analysis of variance (ANOVA) was used to establish whether there were statistically significant differences reflecting age, tenure or the number of previous employers.

Table 6.9 Significant Differences by Age, Tenure, and NOEMP

	(Means)	
Age (Signif)	**Tenure (Signif)**	**No of Employers (Signif)**
WORK (0.0653)	WORK (0.0387)	—

ANOVA did not reveal any significant differences by reason of age, tenure or number of previous employers for the factors identified by factor analysis. However, it did show that nature of work varied significantly according to age, although with a slightly lower significance than 0.05, viz. 0.0653. Also, it showed the same variable to be different for scientists with different lengths of tenure. Here the difference was significant at 0.0387.

Table 6.10 Variables Significant by Age

	(Means)			
Variable	**Group1**	**Group2**	**Group3**	**Signif**
WORK	3.3701	3.6634	3.5241	0.0653

Table 6.10 shows the variable for which there was a significant difference according to age (WORK). Group2 (30-35 years of age) scored the highest followed by Group3 (over 35 years of age), while Group1 (below 30 years of age) scored the lowest. The Scheffe test confirmed that there was a significant difference between Groups 2 and 1. The results seem to indicate that as research scientists become more experienced their work becomes more stimulating and challenging.

Table 6.11 Variables Significant by TENURE

		(Means)		
Variable	**Group1**	**Group2**	**Group3**	**Signif**
WORK	3.4466	3.6920	3.5676	0.0387

ANOVA identified WORK as the only independent variable for which there was a significant difference according to tenure. The mean scores followed the same pattern as that for age. The Scheffe test confirmed that there was a significant difference between Group2 and Group1. As table 6.11 shows, Group1, those who had worked for one to ten years scored the lowest mean, while Group2, those who had worked for 11 to 15 years, scored the highest. Group3, those who had worked for over 16 years scored marginally lower than Group2. As above, it can be argued that greater experience leads to more stimulating and challenging work.

Table 6.12 Group Means for NOEMP

	(Means)			
Variable	Group1	Group2	Group3	Signif
REPUT2	3.8596	3.7216	3.8720	0.6290
MGT	3.1124	3.2487	3.2411	0.5560
PAY	2.7702	2.6161	2.7703	0.4583
PROM	2.9521	3.0883	3.0721	0.5488

The proposition that some independent variables would be linked with low reputation for those with previous employers was not substantiated, either for the revised factors (see table 6.2) or for the original constructs, as Table 6.12 shows. There were no statistically significant differences between the independent variables, MGT, PAY and PROM, whether research scientists were with their first, second, or third or later employer.

In summary the analysis for the original constructs showed that WORK was the only variable for which there was a significant difference according to age or tenure. There were no independent variables for which number of employers made a significant difference.

6.3.2 Educational Qualifications and Field of Specialisation

The original ten constructs were examined by analysis of variance to establish whether there were significant statistical differences by reason of educational qualifications or field of specialisation.

Table 6.13 Variables Significant by QUALDIS

	(Means)			
Variable	**Group1**	**Group2**	**Group3**	**Signif**
PAY	2.7940	2.5667	2.2222	0.0283
WORK	3.4556	3.7034	3.9669	0.0014

In the previous section ANOVA identified PAY and Work as being among the revised factors (see table 6.4) where there was a significant difference in relation to QUALDIS. Table 6.13 shows that Group1 (BScs) had the highest mean score for PAY, followed by second highest Group2 (MScs), while Group3 (PhDs) had the lowest. The Scheffe test confirmed that there was a significant difference between groups 1 and 3. The results here are consistent with what was found in relation to the revised factor (COMPY), i.e. that PhDs are less satisfied with their pay.

As regards WORK, the second significant variable, Group 3 (PhDs) scored the highest mean and Group 1 (BScs) the lowest. The Scheffe test confirmed that there was a significant difference between groups 1 and 3. The results here are consistent with what was found in relation to the revised factor (NATUWORK), i.e. that PhDs rate work higher than Bscs.

As regards the two areas of specialisation (i.e. natural sciences and social sciences), the analysis of variance (ANOVA) did not identify any variable where there was a significant difference. Table 6.14 shows, as was the case with the revised factors (see

table 6.5), that the differences are not statistically significant between Group1 and Group2 for all the independent variables.

Table 6.14 Group Means by Specialisation

	(Means)		
Variable	**Group1**	**Group2**	**Signif**
INNO	3.2620	3.2317	0.7941
JSAT	3.1990	3.3095	0.5069
WCON	3.2293	3.2010	0.7547
WORK	3.5888	3.6171	0.7622
MGT	3.2246	3.2475	0.8600
PEER	3.4463	3.6061	0.1862
PROM	3.0164	3.1377	0.3241
PAY	2.6455	2.6102	0.8019
ACADM	3.5746	3.7279	0.2817
SATIS	3.3862	3.2622	0.3088

6.3.3 Male and Female

It was assumed that there would be differences between male and female research scientists as regards their attitudes to the nature of their work and promotional opportunities. The assumption was not substantiated.

Table 6.15 Variables Significant by Sex

	(Means)		
Variable	**Group1**	**Group2**	**Signif**
PAY	2.8051	2.5407	0.0327

In the previous section ANOVA was reported to have identified pay among the revised factors (see table 6.7) as significantly different according to sex. And using the original constructs the analysis identified PAY as the independent variable where there was a statistically significant difference for the two sexes. As Table 6.15 shows, the men (Group1) scored a mean of 2.8051 while the females (Group2) scored a mean of 2.5407 confirming the results in relation to the revised factor (COMPY).

Table 6.16 Means for Male and Female Groups

	(Means)		
Variable	**Group1**	**Group2**	**Signif**
REPUT2	3.8428	3.7614	0.5941
WCON	3.2684	3.1549	0.1689
INNO	3.2842	3.1547	0.2298
JSAT	3.2577	3.1049	0.3261
MGT	3.2523	3.1144	0.2407
PAY	2.8051	2.5407	0.0327
PEER	3.5681	3.4380	0.2244
PROM	3.1099	2.9093	0.0752
ACADM	3.6667	3.5957	0.5840
SATIS	3.3039	3.2404	0.5783
WORK	3.5667	3.5267	0.6502

Table 6.16 shows that the differences between the men's and women's means for the independent variables were not statistically significant, confirming the result with the revised factors (see table 6.8). Therefore, as stated before, the propositions that women would be content with less important work and that they would view their promotion prospects more pessimistically than men, was not be substantiated.

When the original constructs were analysed by ANOVA, WORK was identified as significantly different according to age and tenure. Groups 2 and 3, who are older and have longer experience, rate work higher than those who are younger and have less work experience. WORK and PAY were identified as significantly different for the groups with differing educational qualifications. The PhDs rated work higher and PAY lower than the BScs. PAY was the only variable which was identified as significantly different for the two sexes, Group2 (Females) rating pay lower.

6.4 Summary

In this chapter I have examined the attitudes to aspects of internal reputation of the social groups as defined by age, length of service (tenure), number of previous employers (NOEMP), sex, educational qualifications (QUALDIS) and field of specialisation (specialisation).

As for reputation there were no significant variations for scientists of different ages, tenures or numbers of previous employers. Therefore the proposition that the older and longer-serving employees would rate reputation higher than the younger employees was not substantiated. Also, the proposition that reputation would be negatively related to the number of previous employers was not borne out. Differences in the ratings of nature of work were significant for different ages and tenures for the original constructs and by age only for the revised constructs. The proposition that the independent variables associated with low reputation by research scientists with previous employment would be pay, managerial style and promotional opportunities was not substantiated.

There was no statistically significant difference in the mean scores for reputation of PhDs, MScs and BScs. Therefore, the proposition that PhD holders would rate reputation lower than MScs and BScs was not borne out. The variables identified as statistically significant for the different qualifications were remuneration and nature of work. Remuneration was rated higher by the less qualified than by the more qualified, but WORK was rated higher by the more qualified than by the less qualified, thus substantiating the proposition that work would be rated higher by PhDs than by BScs or MScs, but not the proposition that PhDs would be less interested in the 'extrinsic' factors such as PAY. No significant differences were identified between these groups in relation to reputation nor for any independent variable between the two broad specialisation groups.

No statistically significant differences were identified between male and female research scientists in relation to reputation. Therefore, the proposition that there would be difference in the rating of reputation between males and females was not substantiated. The proposition that women would rate nature of work lower than men, and would rate their promotion opportunities lower than men was also not borne out.

Chapter Seven

Reputation: Interpreting the Results

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Chapter Seven

Reputation: Interpreting the Results

In chapter four a number of hypotheses were put forward relating to internal reputation. These will be reiterated before I move on to discuss the result of the survey. It is intended that the results should be used as a basis for generalisations regarding all research scientists in the research departments or/and organisations in Bahrain. The discussion will therefore cover the whole sample, that is, all 163 cases. Some of the hypotheses are rejected, some are partially supported and some are confirmed.

Research Hypotheses

h1. Innovative climate (INNO) will be the main determinant of reputation.

h2. General job satisfaction (JSAT) will be the second most important factor in establishing internal reputation.

h3. Work conditions (WCON) will be the third most important factor in establishing internal reputation.

h4. The nature of work (WORK) will be the fourth factor in establishing internal reputation.

h5. Managerial style (MGT) will be the fifth factor in establishing internal reputation.

h6. Reputation will be differently rated by different groups in the department:

a) older research scientists will rate reputation higher than their younger colleagues,

b) those with a PhD will rate reputation lower than those with lower qualifications (MSc and BSc), and

c) men and women will rate reputation differently from one another (nature of difference not specified).

d) natural scientists and social scientist will differ in their ratings.

7.1 The Hypotheses and the Data
INNO, JSAT, WCON, WORK, MGT and Reputation
(Hypotheses 1, 2, 3, 4 and 5)

An examination of the correlation coefficients for the total sample showed that INNO, JSAT, WCON and MGT were strongly related to reputation (0.7426, 0.6727, 0.7081 and 0.6361 respectively - see table 7.1), while WORK had a weaker relationship with reputation, although still a satisfactory one (0.5631). All were significant at the 0.01 level.

Table 7.1 Correlations with Reputation (REPUT2)

	REPUT2	INNO	JSAT	WCON	WORK	MGT
REPUT2	1.0000	.7426**	.6727**	.7081**	.5631**	.6361**
INNO	.7426**	1.0000	.6514**	.8067**	.6513**	.7739**
JSAT	.6727**	.6514**	1.0000	.7059**	.5249**	.5351**
WCON	.7081**	.8067**	.7059**	1.0000	.5757**	.7024**
WORK	.5631**	.6513**	.5249**	.5757**	1.0000	.5525**
MGT	.6361**	.7739**	.5351**	.7024**	.5525**	1.0000

* - Signif. LE .05 ** - Signif. LE .01 (1-tailed)

The correlation matrix (Table 5.8 in chapter 5) detailing the relationship between the eight principal components (revised factors) and reputation showed that all the five independent variables had slightly lower correlations with reputation: INNOCLI (0.6960), JOSAT (0.5703), WKCON (0.5956), NATUWORK (0.5109) and

MGTSTYLE (0.6251). Also, there was similarity to the above result in that INNOCLI, JOSAT, WKCON and MGTSTYLE had strong correlations with REPUT2 while NATUWORK had the weakest correlation (0.5109).

A correlation coefficient describes the relationship between two variables, for example, an independent and a dependent variable. Stepwise analysis identifies the variables which provide the best 'explanation' of the dependent variable. The sample equation derived by stepwise analysis included INNO, JSAT, ACADM and WCON but not MGT and WORK. INNO and JSAT as the first and the second variables entered into the equation of reputation and accounted for 51.4% and 6.9% of the variance respectively. ACADM and WCON were the variables that entered into the equation as the third and fourth and accounted for 2.3% and 1% respectively. The hypotheses that INNO and JSAT would be the main factors in establishing a good internal reputation were, therefore, conclusively confirmed. 'Innovative climate' and 'general job satisfaction' were of major importance to the research scientists employed in the governmental research organisations in Bahrain who were included within the study sample.

WCON was the fourth variable entered into the equation and accounted for only 1% of the variance; so the hypothesis that WCON would be the third most important factor in establishing a good internal reputation was not supported. 'Working conditions' were not perceived as of major importance in determining reputation for research scientists employed in the governmental research organisations in Bahrain.

Possible reasons why WCON was not more strongly associated with reputation are examined in section 7.3.

WORK and MGT did not enter into the equation, so the hypotheses that WORK and MGT would be the fourth and fifth most important factors in establishing a good internal reputation were conclusively rejected. The 'Nature of work and management style' were not of major importance to research scientists employed in the governmental research organisations and did not seem to influence their perception of their place of work. Possible reasons why WORK and MGT were not more strongly associated with reputation are also examined in section 7.3.

However, NATUWORK did figure in the stepwise equation of the eight principle components and its contribution was only 1.7% out of a total of 52% (Adjusted R-Squared). Also, as noted earlier, the multi-collinearity in the equation resulted in a negative regression coefficient (B) for WORK (Table 5.14) confirming that, as stated above, nature of work did not appear to make a direct contribution to scientists' perception of their department's reputation.

The variables identified by principal components analysis followed the same pattern as the original variables: INNOCLI and JOSAT were the main determinants of reputation and there was no relationship between reputation and management style.

7.2 Social Groups and Reputation (Hypothesis 6)

Pelz and Andrews (1976) found distinct differences between R&D employees with a PhD and those with a Bachelor degree in terms of motivation and the quantity of scientific output. These differences were based on the attitudes of PhDs to the degree of autonomy they enjoyed, to communication strategies and to diversity of work. I expected to see such differences reflected in the responses relating to internal reputation.

The literature indicates considerably less 'organisational' identification amongst professional than non-professional employees (Raelin, 1985 & 1986), although there are some who believe that such differences have at least been overstated (Guy, 1985). Nevertheless, the idea that professionals in research organisations have a distinct set of values and orientations is extremely pervasive. If such differences do exist they should be clearly reflected in the responses on reputation. Other sub-groups - divided in relation to age, length of tenure, number of previous employers and sex - were also tested for differences in their responses on reputation. Where reputation was identified as different between groups the independent variables were examined to see why those differences had occurred.

7.2.1 Age, Tenure and Number of Previous Employers

The literature on commitment has established that older employees become more committed to their employer (Mowday, 1982; Mottaz, 1988). Therefore, it was hypothesised that older, longer-serving scientists would rate reputation higher than younger employees. The data did not support this hypothesis. In fact the differences

in the rating of reputation between one age or tenure group and another were only marginally different. I suggest that this should be investigated in future research. Jones (1992a) found that age and tenure related negatively with reputation and that younger employees who had not had their jobs for very long rated reputation higher than older, longer-serving employees - in contradiction to the results of work on organisational commitment where there was a positive association with age (Mowday et al, 1982; Goldberg and Kirschenbaum, 1988). WORK was the variable for which there was a significant difference according to age and tenure for the original constructs and a difference only according to age for the revised factors. The older and longer-serving research scientists scored higher for WORK than the younger ones. As scientists gained in experience, work become more challenging and stimulating to them.

As regards the number of previous employers, groups 1 and 3 i e those who had had one or three or more employers scored slightly higher for reputation than Group2, those with two employers. However, since the differences were not statistically significant, the expectation that reputation would be negatively related to the number of employers was not substantiated. Also, there was no statistically significant difference between independent variables whether research scientists were with their first, second or third (or later) employer. As for the proposition that the independent variables which would be linked with low reputation for those with previous employment experience would be PAY, PROM and MGT was not supported.

7.2.2 Educational Qualification and Specialisation

The results detailed in chapter six failed to establish significant differences in the responses to reputation according to academic qualification and specialisation. However, academic qualification made a significant difference in respect of two of the independent variables. These were PAY and WORK. But no independent variable was significantly affected by the respondents' area of specialisation. WORK was different for each of the three groups (BSc, MSc and PhD). The scores for WORK tended to increase with the qualification level i e PhDs rated work higher than MScs and BScs. Those with higher qualifications would be given and expect to be given work that was intrinsically interesting and demanding. Alternatively, the result could indicate a period of rationalisation, in which research scientists come to terms with the fact that their earlier expectations about work are not going to be fulfilled. This result substantiates the hypothesis that PhDs would rate WORK higher than BScs (Pelz & Andrews, 1976).

PAY was a predictable source of differentiation between groups. PAY was expected to be rated higher by the PhDs than by MScs and BScs. But the expectation was not fulfilled since PhDs rated PAY significantly lower than the other groups, expressing their dissatisfaction, while BScs rated PAY higher than those with higher qualifications, showing satisfaction with their pay. In order to investigate this result more fully, I cross-tabulated age with education. All the PhDs and MScs fell within the older groups of 30 years of age and above, the majority being in the over 35 years category (a total of 47). However, almost double that number i e 91 in the same age category (30 years of age and above) were in the BSc group. This result may,

therefore, be attributed to the fact that the more highly qualified need to keep a certain image in society, which suggests that levels of satisfaction and dissatisfaction with pay have more to do with external than work-related factors.

To summarise, the ratings for reputation were not statistically different for the three groups. PhDs did not rate reputation lower than BSc, as expected. PhDs rated WORK higher than the less qualified and PAY lower.

7.2.3 Male and Female

The responses of male and female scientists were compared and the analysis of variance did not identify any significant differences. The differences in their mean ratings for reputation were insignificant. However, ANOVA identified PAY as significantly different by sex, for both the original and revised factors. Women rated PAY significantly lower than men, showing dissatisfaction with their remuneration. This was because the majority of females included in the study happened to be working as social research scientists who are assigned to the ordinary salary scale while the majority of males were on a professional scale which was higher than the ordinary scale.

It was hypothesised that women would rate WORK lower than men because they would be likely to be given the more menial tasks to perform. This was not substantiated. As for promotion opportunities women rated PROM slightly lower than men for the original constructs and identically for the revised constructs. So the

proposition that women would view these prospects more pessimistically than men was not supported.

In summary, therefore, the proposition that reputation would be rated differently by different social groups was not substantiated. The proposition that older, longer-serving research scientists would rate reputation higher than the younger ones was not substantiated either. However, there were some independent variables that were significantly different according to age and tenure, e.g. WORK. Older, longer-serving research scientists scored higher here. The proposition that number of employers would be related negatively to reputation was not supported. Nor was the proposition that PhDs would rate reputation lower. But WORK and PAY were significantly different for different qualifications. PhDs rated work higher than MScs and BScs, but rated PAY lower than the less qualified. The propositions that reputation would be differently viewed by men and women, with the latter rating the work they did and their promotion prospects lower than males were not supported by the survey results.

7.3 WORK, MGT and Reputation

As I pointed out in the preceding section, the hypotheses that WORK and MGT (managerial style) would be the fourth and fifth most important factors in establishing reputation were not supported by the data. It is obviously of some importance to the thesis to offer an explanation of why WORK and MGT were not more important determinants of reputation. To begin with, I will re-examine the variables which were strongly related to reputation.

The REPUT2 equation, which used the eight factors identified by principal components analysis as the independent variables (Adjusted R-Squared = 52%), identified by stepwise analysis and confirmed by forward selection (see chapter 5) contained four variables: INNOCLI, JOSAT, NATUWORK and QUALDIS. And the equation which used the original ten factors identified by stepwise analysis and confirmed by forward selection contained four variables: INNO, JSAT, ACADM and WCON (Adjusted R-Squared = 62%). Because the level of explanation was considerably higher in the case of the original constructs I decided to concentrate on the second equation. The main four independent variables that determined reputation were: INNO, JSAT, ACADM and WCON. The two main variables were INNO and JSAT, accounting for 51.4% and 6.9% of the variance respectively. As these two accounted for most of the variance, I will concentrate on them.

INNO and INNOCLI were the main explanatory variables for REPUT2 equations using both the original and revised constructs. This, therefore seems to confirm that an innovatory climate is the main determinant of internal reputation. Jones (1992a) argued that the idea of innovative climate is based on the distinction drawn by Burns and Stalker (1961) between mechanistic-bureaucratic and organic-professional organisation. Hull (1988, p393) suggested that "the output of inventions is more proportional to R&D input if organisation design is organic". Hull (1988, p404) found general support for the thesis that organic structures are best for stimulating innovation and is committed to the organic-professional principle of organisational structure but he does not describe the nature of R&D work in detail. However, he does discuss the organisational design needed to stimulate innovation: one with

vertical and horizontal differentiation, centralisation, control by feedback and control by plan. The concept of an innovatory climate was operationalised by Jones using the work of Siegel and Kaemmerer (1978). However, the Siegel Scale of Support for Innovation (SSSI) was reduced from 60 items to nine by Jones for the purpose of his study which upon testing for reliability produced an alpha coefficient of 0.8290. I have used the same nine item scale for innovation on my data, which produced an alpha coefficient of (0.8316). The INNO items concentrated on establishing the extent to which scientists were encouraged, or allowed, to be creative and independent in their work. Principal components analysis established INNOCLI as a variable containing items which emphasised the importance of creativity, problem-solving and new ideas.

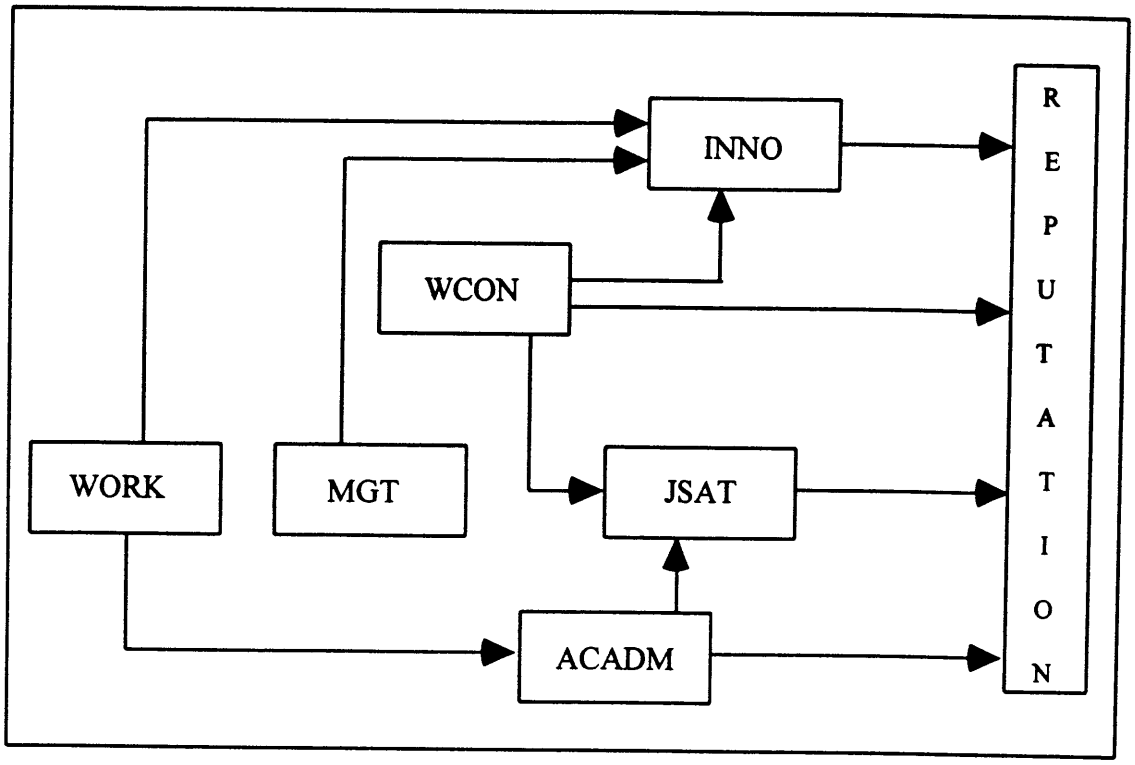
The argument put forward by Jones (1992a) to explain why WORK and MGT were not more strongly related to reputation was based on the work of Abbey and Dickson (1983) who point out that creating an innovatory climate can be perceived as a managerial function. This seems to apply here as well. That is, WORK and MGT may influence reputation indirectly through innovative climate rather than directly. This seems to be confirmed by the INNO equation which was constructed by stepwise analysis (table 5.18); in the equation MGT and WORK were the second and third variables after WCON and contributed 9.3% and 1.9% of the total value of adjusted R-Squared. Consequently, an innovatory climate is primarily determined by working conditions, the management style and the nature of the work.

7.3.1 Path Analysis

As pointed out above, the data did not support the hypotheses that WORK and MGT would be the fourth and fifth most important factors in establishing good internal reputation. However, I suggested that the two variables might act through innovatory climate to affect reputation indirectly. And in chapter five I proposed to examine the relationships between the independent variables more closely, given the high degree of inter-correlation. Therefore, I constructed a model in which the causal relationships between a number of variables were suggested. De Vaus (1990, p214) emphasises that such models must be developed 'on the basis of sound theoretical reasoning'. However, since no definitive theory exists to define the relationships between the dependent and independent variables, I had to rely on the earlier data analysis.

In this model I propose to retain the four determinants of reputation which were identified earlier (INNO, JSAT, ACADM, WCON). WORK and MGT, which appeared to affect reputation via innovatory climate, were added to the model. In addition, I suggest that WORK will influence ACADM. That is, the nature of the work being carried out in the department/organisation as regards its innovativeness and scientific or technological importance will affect the academic and scientific reputation of the organisation and will add to its overall reputation. In fact, when a stepwise analysis equation was constructed for ACADM as the dependent variable it was found that WORK was the second main explanator in the equation after WCON. Therefore I propose to investigate this influence further. Figure 7.1 illustrates the inter-relationships between the variables.

Figure 7.1 Path Diagram



Path analysis is a technique of testing, not of generating theory, and is used for testing 'causal' models. As Kerlinger and Pedhuzar (1973, p305) point out, "it is important to note that path analysis is not a method for discovering causes but a method applied to a causal model formulated by the researcher on the basis of knowledge and theoretical considerations". The causal ordering, according to Duncan (1980), is based on prior assumptions and path analysis makes those assumptions explicit. Basically the model is constructed by drawing unidirectional arrows, representing the paths, from the independent to the dependent variables. Next the path coefficients for each of the relationships are established. The standardised regression coefficients (beta weights) give the value of the path coefficients and are established by regression analysis. Kerlinger and Pedhuzar (1973, p314) indicate that the difference between

ordinary regression and path analysis is that more than one regression analysis is called for: "At each stage, a variable taken as dependent is regressed on the variables upon which it is assumed to be dependent".

Table 7.2 Path Analysis Equations

Dependent Variable	R-Squared	Adjusted R-Squared
REPUT2	0.6524	0.6435
INNO	0.7609	0.7351
JSAT	0.5769	0.5351
ACADM	0.5533	0.5091
WCON	0.7320	0.7031
MGT	0.6490	0.6111
WORK	0.5879	0.5435

First, reputation (REPUT2) was regressed on INNO, JSAT, ACADM and WCON to establish the first path coefficients. Next, each independent variable was treated as a dependent variable and regressed on the remaining independent variables. Table 7.2 gives the R-Squared and adjusted R-Squared values for each of the equations. The resultant model is drawn with each of the path coefficients included (figure 7.2). The equations identified three variables, PEER, PROM and SATIS, as adding to the explanation of reputation. However the indirect effects of these variables had to be assessed before they were considered for inclusion in the model. Since the path coefficients are standardised it is possible to make direct comparisons when analysing the various effects.

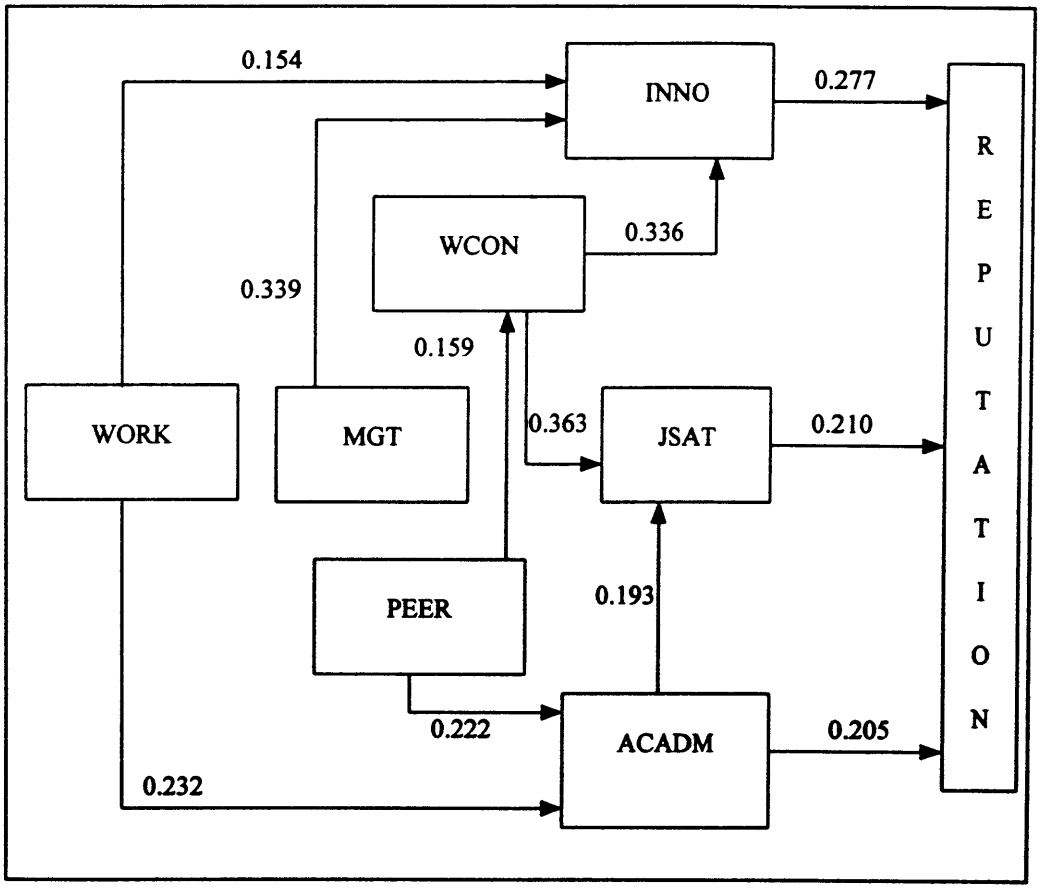
To asses the importance of an indirect path, the coefficients along the path are multiplied together. Table 7.3 gives the total direct and indirect effects of each of the variables on reputation. The resultant model was modified on the basis that if the beta coefficient was not significant, the paths could be deleted. This is referred to as 'theory trimming' (Kerlinger and Pedhuzar, 1973, p318). Also I compared the total indirect effects of the variables and decided to delete some paths.

Table 7.3 Direct and Indirect Effects on Reputation

Variable	Indirect Effect	Direct Effect	Total Effect
INNO	—	0.277	0.277
JSAT	—	0.210	0.210
ACADM	0.0405	0.205	0.2455
WCON	0.1692	0.156 (sig. 0.08)	0.1692
WORK	0.0901	—	0.0901
MGT	0.0939	—	0.0939
PROM	0.0199	—	0.0199
PEER	0.0723	—	0.0723
SATIS	0.0077	—	0.0077

The analysis indicated that PEER and SATIS affected reputation via WORK. The total indirect effect of SATIS was 0.007 (Beta coefficient) compared with the indirect effect of PEER which was 0.0723. Therefore, it was decided to exclude SATIS from the model. PROM was also identified as affecting reputation via MGT. The total indirect effect of PROM was 0.019 (Table 7.3) and using the same argument it was decided to leave it out of the reputation models.

Figure 7.2 Path Diagram with Coefficients



Of the links hypothesised in the path diagram (Figure 7.2) only the relationship between WCON and REPUT2 was not significant. The level of significance was 0.08 and therefore the direct path between WCON and REPUT2 was deleted. It seems that

the research scientists' perception of reputation is not influenced by their working conditions directly but rather indirectly through innovatory climate and general job satisfaction. This seemed to confirm the equation for REPUT2 with WCON as the fourth determinant, accounting for only 1% of the variance, while in the equation for INNO, WCON was the main determinant, accounting for about 63% of the variance (Table 5.18).

The analysis identified PEER as adding to the explanation of reputation. PEER contributed indirectly via ACADM and WCON, its total indirect contribution amounting to 0.0723 which was similar to the contributions of WORK and MGT i.e. 0.0901 and 0.0939 respectively (see table 7.3). Therefore it was decided to include PEER in the model.

The influence of PEER can perhaps be attributed to the fact that members of work-groups offer new ideas for solving work-related problems and exchange ideas and opinions about their research. This is bound to increase the academic and scientific reputation of the department and the organisation as a whole and so add to the overall internal reputation. In fact positive answers to questions about whether members of work-groups offered each other new ideas for solving problems and whether they exchanged opinions and ideas about their research were given by 45% of respondents. Only about 9% did not answer the first question positively and 14% the second. In the stepwise equation for ACADM, PEER was the third determinant and contributed 4% toward the explanation of the variance.

The path diagram also showed a link between PEER and working conditions; research scientists' perceptions of their working conditions are influenced by their view of whether their peer-group provides a friendly atmosphere in which to work. Actually the response to the question about how friendly and easy to approach the members of the immediate work-group were about 88% for very friendly and friendly and about 2% for the contrary. The equation for WCON (table 5.17) showed PEER to be the third determinant with a contribution of 2.1%.

The direct effects shown in table 7.3 confirm that INNO and JSAT are the most important determinants of reputation. ACADM is associated positively and directly with reputation while WCON is associated with it indirectly via innovatory climate and general job satisfaction. MGT affects reputation via INNO and WORK affects reputation through INNO and also via ACADM. Figure 7.2 shows that WCON affects reputation indirectly through JSAT and it seems that scientists' perception of their overall job satisfaction is influenced by their working conditions. This confirms that WCON was the main determinant of JSAT in the equation in table 5.18. In fact it contributed 47% toward a total explanation of variance of 56% (Adjusted R-Squared). The results shown in table 7.3 support the finding that INNO has the largest effect on reputation. An important point to note is that although the technique of path analysis clarified a number of relationships in the model, it would be very difficult to claim that the model above is definitive. Nonetheless, I believe that it represents the best explanation of reputation within the limits of the independent variables used in this thesis.

To summarise, path analysis has clarified the relationships between the independent variables and reputation. It has been particularly useful in confirming the indirect relationship between working conditions (WCON), work-related tasks (WORK), management style (MGT) and reputation. Also, it has been useful in identifying a variable, PEER, which is associated with reputation indirectly through ACADM and WCON.

7.4 Comparison of Results

In this section the results of the present study will be compared with those of the study done by Jones (1992a), together with the results discussed in a more recent publication (Jones, 1996). Jones (1996) used the revised independent variables identified by principal components analysis from his original study and demonstrated that innovatory climate and job satisfaction were the main and the second determinants of internal reputation, accounting for 29.7% and 6.6% of the variance respectively. These results support the finding of the Bahrain study that INNO and JSAT are the main determinants of internal reputation, and is important in stressing the importance of innovatory climate and job satisfaction for innovation and creativity, which can be regarded as the main ingredients of successful R&D. Any differences relating to the testing of the hypotheses stated in the methodology chapter will be discussed. I expect that part of the explanation will lie with the cultural differences. This could have been clearly demonstrated if the same questions about the cultural aspect had been posed to scientists in both the UK and Bahrain. But since the questions included in my questionnaire were not asked of the UK scientists, I had to find another way of resolving the cultural issue. The work of Hofstede (1980) on

culture and organisations presented a viable means of doing this. A summary of his work is given in appendix 5. I will use his work to ascertain the position in Britain as regards four dimensions of culture he stipulates in his work and these will be the basis for the cultural comparison. The four dimensions, discussed in the chapter 4 were 'Individualism versus collectivism', 'Power distance', 'Masculinity versus femininity', and 'Uncertainty avoidance'. For the purposes of the comparison I am assuming that Bahrain's social characteristics do not deviate very much from those of the group of Arab-speaking countries (ARA) included in the Hofstede study. The ARA group included countries from the Arabian Gulf corporation council (GCC) of which Bahrain is a member and shares their language, customs and religion.

Table 7.4 shows the relative positions of Britain, a group of Arab-speaking countries (ARA), and Bahrain in relation to the four dimensions of culture. The Hofstede study (1981) ascertained the position of Britain and ARA amongst other countries in relation to those dimensions and the Bahrain study similarly established the position of Bahrain (for more detail see appendix 5). As table 7.4 indicates, the Hofstede study showed a clear difference between Britain's and ARA culture. It indicates too that Bahrain's culture is almost identical to ARA culture and is equally different from that of Britain. Now if, as suggested earlier, Bahrain and ARA share the same culture, the results of the Hofstede study and those of the Bahrain study are quite comparable.

Table 7.4 Culture Dimensions' Comparison

Dimension	Hofstede Study		Bahrain Study
	Britain	ARA	
Power Distance.	Small PD.	Large PD.	Large PD.
Individualism Versus Collectivism.	Individualist	Collectivist.	Collectivist.
Masculinity Versus Femininity.	Masculine.	Slightly Masculine.	Feminine.
Uncertainty Avoidance.	Weak UA	Strong UA.	Strong UA.

The most distinct differences, according to these two studies, between the British and Bahraini cultures are that in Britain there is a limited dependence of subordinates on bosses (Small power distance), while in Bahrain subordinates are unlikely to approach and contradict their bosses directly (Large power distance); that in Britain importance is given to personal time, freedom, and challenge, while in Bahrain importance is given to training, physical conditions, and use of skills; that in the work place in Britain mangers are expected to be decisive and assertive and to resolve conflicts by confronting them (Masculine), while in Bahrain managers are supposed to use intuition and strive for consensus and the resolution of conflicts by compromise and negotiation (Feminine); and finally that in Britain deviant and innovative ideas are tolerated and motivation comes from achievement, while in Bahrain deviant ideas and

behaviour are suppressed and innovation resisted and people are motivated by the desire for security.

These cultural characteristics influence the effectiveness of research organisations. R&D productivity has been attributed to different factors, among which national culture is one. For example, a study by Bergen et al (1988) examined the R&D performance of 54 scientific instrument manufacturers in four countries; UK, US, Germany and Japan. The authors identified clear differences in productivity which they attributed to differences of national culture. Some writers have attributed R&D productivity to technology (Dumbleton, 1986), organisational factors such as administrative systems and public policy (Tonatzky & Fleischer, 1990) and the creativity and motivation of scientists (Pelz & Andrews, 1976). Higher R&D effectiveness has on the other hand been shown by others to be associated with 'organic' characteristics (Abbey & Dickson, 1983; Keller & Holland, 1983; Pelz & Andrews, 1976; Tonatzky & Fleischer, 1990). A close examination of the characteristics of organic structure suggests that they are very similar to the characteristics found in small PDI countries. As Britain is one of the low PDI countries (Hofstede, 1980), it has the characteristics of the "organic" structures. Kedia et al (1992, p13) in their study lent support to the view that R&D units located in low PDI countries had higher productivity.

The opposite of 'organic' structures are 'Bureaucratic/mechanistic' structures, which are characterised by specialised and differentiated tasks, centralisation of authority, strict hierarchy of control and communication, and an emphasis on directions and

orders from the top (Burns & Stalker, 1961; Zaltman, Duncan & Holbeck, 1973). Hofstede (1980) described the characteristics of high PDI countries where subordinates are dependent on superiors whose autocratic decisions are generally not questioned or challenged, and where administrators tend to use more coercive methods. An examination of high PDI characteristics suggests that they are similar to those of mechanistic or bureaucratic structures (Kedia et al, 1992). Since Bahrain a high PDI country, it is characterised as having a 'mechanistic' structure.

7.4.1 Main Hypotheses (h1, h2, h3, h4, h5)

The hypothesis (h1), that the main determinant of internal reputation among research scientists would be innovatory climate (INNO), was confirmed by my study and Jones studies (1992a, 1996), as table 7.5 shows. In fact INNO accounted for 51.4% of the total variance in my study and was the main factor affecting reputation, while it accounted for 35% (1992a) and 29.7% (1996) of the variance in Britain. The perceptions of scientists, in both countries, of innovatory climate as the main determinant of internal reputation suggest that establishing an innovatory climate is vital in the creation of a good internal reputation. The importance of establishing an innovatory climate in R&D departments has a strong tradition in the literature, for example Burns and Stalker (1961), James and Jones (1974), Jones and James (1979) and Siegel and Kaemmerer (1978). More recent examples are Tushman and More (1988), West and Farr (1990), Ekvall (1984 & 1993) and Nystrom (1990). Moreover, both Porter (1985) and Twiss (1992) identify links between a reputation for innovation and the recruitment of creative people and the stimulation of creativity and innovation within an organisation.

Table (7.5) Summary of Findings Between Bahrain and UK Studies on Internal Reputation

Hypothesis/Proposition	Bahrain Study	UK Study
h1. Innovative climate (INNO) is the main determinant of internal reputation.	INNO was the main factor in determining reputation (51.4% of variance).	INNO was the main factor in determining reputation (35% of variance) (1992a); (29.7 of variance) (1996).
h2. Job satisfaction (JSAT) is the second most important factor in determining internal reputation.	JSAT was the second most important factor in determining internal reputation (6.9% of Variance).	JSAT was not an important factor in determining reputation (1992a). However, in 1996 study JOSAT was the second most important factor (6.6% of variance).
h3. Working conditions (WCON) are the third most important factor in determining internal reputation.	WCON was the fourth most important factor in determining reputation (only 1% of variance).	WCON was the second most important factor in determining reputation (14% of variance) (1992a); the fourth factor (1.9% of variance) (1996).
h4. The nature of work (WORK) is the fourth most important factor in determining internal reputation.	WORK was not a direct determinant of reputation but affected reputation indirectly through INNO.	WORK was not a main determinant of reputation. Affected reputation indirectly through INNO.
h5. Managerial style (MGT) is the fifth most important factor in determining internal reputation.	MGT was not an important factor in determining reputation. Affected reputation through INNO.	MGT was not an important factor in determining reputation. Affected reputation through INNO.
h6. Reputation is different for different social groups in department: 1) Older scientists rate reputation higher than younger colleagues.	Not substantiated; ratings were not statistically significant.	Not substantiated; on the contrary younger employer rated reputation higher than older colleagues.

Cont'd Table (7.5) Summary of Findings Between Bahrain and UK Studies on Internal Reputation

Hypothesis	Bahrain Study	Britain Study
2) Longer serving scientists will rate reputation higher.	Not substantiated; the differences in ratings of reputation were not statistically significant.	Not substantiated; reputation was related negatively to length of service.
3) Reputation will be negatively related to the number of previous employers.	Not substantiated; differences not statistically significant.	Not substantiated; the differences were not statistically significant.
4) PhDs will rate reputation lower than MScs and BScs.	Not proved; ratings were not significantly different.	Results failed to establish significant differences in responses to reputation.
4.1) PhDs will rate WORK and PAY higher than the lower qualified.	Proposition substantiated for WORK but not for PAY.	Proposition substantiated for PAY but not for WORK.
5) Men and Women will differ in reputation ratings.	Not supported; ratings of reputation were not significantly different.	No difference.
5.1) Women will rate work and promotional opportunities (PROM) lower than men.	Not substantiated; ratings for WORK and PROM were not statistically significant.	Lower rating for WORK was supported; lower rating for PROM was not.
Main determinants of internal reputation.	INNO (51.4%), JSAT (7%), ACADM (2.3%), WCON (1%).	INNO (35%), WCON (14%), AGEDIS (3%), TEAMWK (2.6%), PROM (0.6%) (1992a). CLMAT (29.7), JOSAT (6.6), TENDIS (3.3%), WKCON (1.9%), COMPY (0.7%) (1996).

Innovatory climate is established by an environment in which scientists believe that they can work creatively, can be free to use different methods of looking at problems, are encouraged to develop new ideas and have adequate support and assistance (Jones, 1996). Individual freedom and autonomy are fundamental to R&D (Ben-David, 1971) and therefore authoritarian regimes are detrimental to the pursuit of science (Barber, 1952; Merton, 1973; Richter, 1981).

These characteristics of an innovatory environment are associated with weak uncertainty and low power distance culture (see appendix 5), as in Britain. On the other hand, Bahrain is designated as a strong uncertainty and high power distance culture (Table 7.4), the main features of which are suppression of deviant ideas and behaviour, resistance to innovation and motivation by security and esteem or 'belongingness'. Therefore, the fact that scientists' perceptions in both countries were that innovatory climate was important for good internal reputation suggests that scientists may have some characteristics in common, regardless of culture with the main effect coming from the nature of their work and socialisation during the course of study (Toren and King, 1982). Paradoxically, here we have two different organisational structures i.e. organic (UK) and mechanistic (Bahrain) which share a common perception. Therefore I propose to undertake a further investigation in the future to resolve this paradox.

I also hypothesised that general job satisfaction (h2) would be the second most important factor in establishing good internal reputation. My study of Bahrain confirmed that JSAT was the second main determinant of reputation and accounted

for 6.9% of the variance. The UK study too identified JSAT as the second main factor determining internal reputation (Jones, 1996). The literature dealing with professionals in organisations has long identified the need for work which is intrinsically satisfying, for example Kornhauser (1962), Cotgrove and Box (1970), Gouldner (1957) and Pelz and Andrews (1976). Also, Raelin (1985) identifies a number of factors which are essential to professionals in organisations, such as autonomy, job challenge, work variety (which allows the individual to use different skills) and meaningful work. In other words Raelin regards the challenge provided by interesting and varied work as the main motivational force for professional employees. Jones (1996, p281) emphasises this point: "There are strong links between innovatory climate and job satisfaction. This research clearly confirms that working in an atmosphere which encourages freedom and autonomy is essential to establishing organisational reputation amongst R&D scientists".

Working conditions (WCON) was hypothesised to be the third most important factor in determining internal reputation amongst research scientists in Bahrain. This was supported by Bahrain's being deemed to have a collectivist culture (see Appendix 5, and table 7.5) of which training and physical conditions are the main traits. Also, it is believed that a positive work - setting is important for establishing strong organisational attachments amongst scientists (Goldberg and Kirchenbaum, 1988). Good communication policies are particularly crucial in stimulating high scientific performance (Pelz and Andrews, 1976). Although both studies identified WCON as a factor in determining internal reputation, the extent to which it explained the variance was very different. The Bahrain study identified WCON as the fourth determinant of

reputation, contributing a mere 1% to the explanation of the variance. The UK study identified WCON as the second most important factor, accounting for 14% of the explanation of the variance (1992a). However, in the later analysis by Jones (1996) WCON was found to be the fourth determinant of reputation accounting for 1.9% of the explanation of the variance. Path analysis, as will be shown in the following section, revealed that in the UK study WCON had the effect on reputation and accounted for a total effect of 0.667 (Beta weight, table 7.6). In the Bahrain study path analysis (Table 7.3) showed that WCON did not affect reputation directly since its path to reputation was found to be statistically insignificant (0.08) and its effect on reputation came only via innovatory climate (Figure 7.2).

Hypotheses (h4) and (h5) were rejected in both studies. That is, the nature of work (WORK) and the way the scientists were managed, i.e. managerial style (MGT), were perceived not to have a direct effect on reputation by the scientists in both countries. However, path analysis (section 7.3) did confirm the expectation that WORK and MGT would affect reputation via innovatory climate (INNO). This was also found to be true in the UK study. This result seems also to suggest that research scientists may share common characteristics by reason of the nature of their work despite cultural differences. Although, I do not think there is enough to draw any general conclusions, I believe that this question should be followed up in future research.

7.4.2 Comparison of Path Analysis Results

Table 7.6 shows the findings of the path analysis models of both studies. As can be seen the two models have some variables in common but the effects on reputation

differ. The Britain model comprises the following independent variables: INNO, WCON, TEAMWK, PROM, AGEDIS, MGT, and WORK. The Bahrain model includes INNO, JSAT, ACADM, WCON, WORK, MGT and PEER. The two have the following variables in common: INNO, WCON, WORK, and MGT. The effect on reputation in the two is the same with the variables INNO, WORK, and MGT but not with the other common independent variable, WCON. INNO affects reputation directly in both models, although to a different extent. Taking the measure of beta coefficient as a basis for comparison (since, as mentioned earlier, because the beta coefficients are standardised it is possible to make direct comparison in analysing the various effects), the effect of INNO in the Bahrain model is slightly higher at 0.277, compared with 0.241 for the Britain model. This perhaps suggests that the scientists surveyed in both studies perceived innovatory climate to be essential for internal reputation. WORK and MGT influence reputation indirectly in both models (beta coefficients are small and not statistically significant). However, in the Britain model WORK and MGT affect reputation through INNO, and through PROM and TEAMWK. In the Bahrain model WORK affects reputation through INNO and ACADM and MGT through INNO only.

WCON, in the UK model, influenced reputation both directly (beta 0.494) and indirectly (beta 0.173) via INNO, TEAMWK, and PROM, with a positive total effect of 0.667. In the Bahrain model WCON affects reputation indirectly via INNO and JSAT with a total effect of 0.169. Table 7.6 also shows the independent variables that were included in the Bahrain model and not in the Britain model and vice versa. The Bahrain model includes JSAT which has a positive direct effect on reputation;

ACADM which also has a positive direct effect as well as indirect effect on reputation; and PEER which has an indirect effect via both ACADM and WCON. The Britain model includes TEAMWK which has a positive direct effect on reputation and AGEDIS which has a direct negative effect on reputation but a positive indirect effect via WORK.

Table 7.6 Path Analysis Comparison Between Britain and Bahrain Studies

Variable	Indirect Effect		Direct Effect		Total Effect	
	UK	Bahrain	UK	Bahrain	UK	Bahrain
INNO	—	—	0.241	0.277	0.241	0.277
JSAT	—	—	—	0.210	—	0.210
ACADM	—	0.0405	—	0.205	—	0.2455
WCON	0.173	0.169	0.494	—	0.667	0.169
WORK	0.079	0.0901	—	—	0.079	0.0901
MGT	0.047	0.094	—	—	0.047	0.094
PROM	0.030	—	0.093	—	0.123	—
PEER	—	0.0723	—	—	—	0.0723
TEAMWK	—	—	0.168	—	0.168	—
AGEDIS	0.016	—	-0.165	—	-0.149	—

7.4.3 Social Groups (Hypothesis 6)

The proposition that older scientists would rate reputation higher than their younger colleagues was not substantiated by either study, although for different reasons. In my study the responses were not significant and the ratings were not significantly different, while in the UK study the younger group rated reputation higher than their older colleagues. The same was true in the case of tenure (length of service). In both studies the differences in the ratings for reputation by the groups who had worked for different periods were not significant. The UK study showed that reputation was negatively related to tenure, as was age. This finding of the UK study is in direct contradiction of work on organisational commitment which shows a positive association with age (Mowday et al, 1982; Goldberg and Kirchenbaum, 1988). Jones (1992a) argued that this result suggested that older, longer-serving employees became more attached to their employer while at the same time they tended increasingly to regard the organisation as an unsatisfactory place to work.

It was proposed that reputation would be negatively related to the number of previous employers. This was not supported by either study; the differences between the groups were statistically insignificant. The hypothesis that scientists with a PhD would rate reputation lower than those with a MSc or a BSc was not substantiated by either study. It was expected that PhD holders would rate WORK and PAY higher than the BScs. In my study the PhDs rated WORK higher and PAY lower than the less qualified (BScs). The UK study showed that PAY was rated higher, as expected, by professional groups than by the non-professional. It was argued that this indicated that a period of financial stability was being enjoyed by the professional group.

However, the data failed to substantiate that PhDs rated WORK higher than less qualified scientists.

The proposition that men and women would differ in their ratings of reputation was not substantiated by either study. The differences in the ratings were statistically insignificant. Also, the proposition that women would rate WORK and promotion opportunities lower than their male colleagues was not supported in my study. The ratings for WORK and PROM were only marginally different. In the UK study a lower rating for WORK was, as expected, given by women but not for PROM.

7.4.4 Reputation

The models of reputation produced by the two studies were slightly different. In my study reputation was determined by innovatory climate, job satisfaction, academic and scientific reputation and working conditions. Thus the model, with the contribution of each determinant toward the explanation of the variance, is:

Reputation: INNO (51.4%), JSAT (6.9%), ACADM (2.3%), WCON (1%).

The UK model identified, as the determinants of reputation, innovatory climate, working conditions, age distribution, teamwork and promotion opportunities i.e.:

Reputation: INNO (35%), WCON (14%), AGEDIS (3%), TEAMWK (2.6%), PROM (0.6%).

The UK model (Jones, 1996) identified the determinants of reputation as innovatory climate (INNO) and job satisfaction (JSAT). This supports the findings of the Bahrain study regarding the main determinants of internal reputation.

7.5 Summary

The hypotheses that INNO and JSAT would be the main and the second most important determinants of reputation in Bahrain were substantiated. The stepwise equation constructed for reputation contained four variables, INNO, JSAT, ACADM and WCON which accounted for an explanation of 62% of the variance. INNO and JSAT alone accounted for 58.3%. The hypothesis that WCON would be the third determinant of reputation was not supported. In fact it was the fourth most important determinant after ACADM, accounting for only 1% of the explanation of the variance. The hypotheses that WORK and MGT would be the fourth and fifth determinants of reputation were rejected. However, path analysis confirmed that WORK and MGT affected reputation indirectly through innovative climate.

The data on social groups did not produce support for the propositions that reputation would be rated differently according to age, tenure, NOEMP, qualification and sex. The only independent variable that was significantly different according to age and tenure was WORK. In both cases the older and longer-serving scientists rated WORK higher than the younger research scientists, confirming that as scientists gain in experience work becomes more challenging and stimulating. There were significant differences in the responses to two independent variables by those with different qualifications; PAY (significant at 0.0283) and WORK (significant at 0.0014). PAY

was rated lower by the PhDs, contradicting the expectation that PhDs would rate PAY higher than BScs. WORK, however, was rated higher by the PhDs, confirming the proposition that PhDs would rate their work higher than BScs. The hypotheses that men and women would differ in their ratings of reputation was not supported, nor were the hypotheses that women would score WORK and promotion opportunities lower.

In the section on comparisons of results, the findings of the Bahrain study and the UK study were found to be in agreement to a large extent. Hypothesis h1, making INNO the main determinant of reputation, was supported by the Bahrain study and the UK (1992a & 1996) studies. Hypothesis h2, that JSAT would be the second most important determinant of internal reputation, was supported by the Bahrain study and the 1996 UK study. Hypothesis h3 that WCON would be the third determinant of reputation was not supported by the Bahrain study; but WCON was shown to be the fourth determinant of reputation, affecting it indirectly through INNO. In the UK study WCON was the second most important determinant of reputation (accounting for 14% of the variance), but in the 1996 study it was identified as the fourth determinant of reputation, contributing only 1.9% toward the explanation of the variance. This is very close to the Bahrain result in that WCON was the forth determinant, accounting for only 1% of the variance.

Hypotheses h4 and h5 that WORK and MGT would be the fourth and fifth determinants of reputation were rejected by the Bahrain study; and that they would be the main and second most important determinants by the UK study. However, by

using the technique of path analysis both studies showed that WORK and MGT affected reputation through INNO.

The hypotheses on social differences (h6: a, b and c) were not supported by either study. As regards (b) the UK study showed that the contrary of the hypothesis was true, i.e. younger scientists rated reputation higher than the older ones; the same was also true for tenure. The proposition that reputation would vary negatively with an increase in the number of previous employers was not substantiated by either study. Nor was the proposition that PhDs would rate reputation lower than those with lower qualifications. The propositions that WORK and PAY would be rated higher by PhDs than by BScs were supported for WORK but not for PAY in the case of the Bahrain study and for PAY but not for WORK in the case of the UK study. The proposition that men and women will differ in their ratings of reputation was not substantiated in either study.

The models of reputation for the two studies were:

Reputation (Bahrain):	INNO (51.4%), JSAT (6.9%), ACADM (2.3%), WCON (1%)
Reputation (UK): (Jones, 1992a)	INNO (35%), WCON (14%), AGEDIS (3%), TEAMWK (2.6%), PROM (0.6%)
Revised Reputation (UK): (Jones, 1996)	CLMAT (29.7%), JOSAT (6.6%), TENDIS (3.3%), WKCON (1.9%), COMPY (0.7%).

The conclusions, practical implications for the management of research scientists and suggestions for future work will be outlined in the final chapter (Chapter 8).

Chapter Eight

Conclusion and Future Research

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Chapter Eight

Conclusion and Future Research

8.1 Overview of the Research

'Reputation' has been used in the literature to describe a variety attributes of organisations. In this research I have concentrated on defining and operationalising the concept of human resource reputation (Jones, 1996). The subject was scientists employed in research organisations in Bahrain. 220 questionnaires were distributed to all governmental research organisations in Bahrain and 163 completed questionnaires were returned, a response rate of 74%. As far as possible I confirmed that the sample was representative by comparing it with the total number of research scientists who worked in the research organisations.

There were 109 male respondents (67%) and 54 females (33%). As for academic qualifications, almost 67% of the sample possessed a BSc and 43 (26%) an MSc; only 9 (6%) had obtained a PhD. Of the respondents 14% were 25-29 years old, 36% 30-35 years old, 29% 36-40 years old and 21%, 41 years old or more. Research scientists with 1-5 years service constituted 19% of the sample, those with 6-10 years 18%, those with 11-15 years 31% and those with 16 years service or more 30%. Those who had had only one employer were 29% of the sample, those who had had two employers 35% and those who had had three employers or more 36%.

The aim was to establish the determinants of internal reputation amongst research scientists in Bahrain and compare the results with a similar studies carried out on R&D scientists in ten high technology organisations in Britain (Jones, 1992a & 1996). I hypothesised that innovatory climate, general job satisfaction, work condition, the nature of work and management style would be the most important factors in establishing internal reputation among research scientists in Bahrain. These hypotheses were based on a preliminary survey and some semi-structured interviews with research scientists and their supervisors in Bahrain and on the relevant literature. In addition, I assumed that age, length of service, number of employers, qualification, specialisation and sex would make a difference to the rating of reputation.

8.2 Principle Components Analysis

The first statistical analysis I carried out was to test the internal consistency of the nine constructs which were shown to be relevant to the relationship between research scientists and their place of work and would determine the latter's internal reputation (Jones, 1992a). The Cronbach (1951) reliability alpha coefficient test was used for this purpose and strong reliability levels were established for all the variables except PROM and ORGN. The first, PROM, indicates the opportunities for promotion, and the second, ORGN, the extent to which the scientists are satisfied with their organisation as a whole. Therefore, it was decided to examine these two variables by principal components analysis. This confirmed that PROM was a coherent construct. I decided to use it in its truncated form (alpha for PROM 0.7599). As for ORGN, the analysis identified two coherent factors with Eigen values greater than one which accounted for 49% of the total variance. Therefore, ORGN was replaced by two

factors, ACADM and SATIS, i.e. the organisation's academic and scientific reputation and the research scientists' satisfaction with the organisation. Thus the number of independent variables was raised to ten.

8.3 REPUT2 as a Measure of Reputation

Jones (1992a) examined the ninety-eight Likert-type items on the questionnaire by principal components analysis. This led to the emergence of a cluster clearly distinguishable as reputation (REPUT), which consisted of REP1, REP2, ORGN2, ORGN3 and WCON14. The construct (REPUT) was regarded as coherent as it had an alpha value of 0.804 and provided a fuller embodiment of the concept of internal reputation. Therefore, the same technique, principal components analysis, was used to investigate the Bahrain data with a view to identifying a cluster of items for reputation based on the perceptions of the research scientists in that country of the factors that affected the relationship between them and their employers. The items established by the analysis were examined for statistical significance. The Kaiser-Meyer-Olkin measure of sampling adequacy was equal to 0.801 and the Bartlett test of sphericity (4857) was significant at the .0000 level.

Nine factors were identified and compared with the original constructs. They had their analogues in quite similar factors, although the overall number of items for some constructs was considerably reduced. WORK originally included 15 items while the new factor NATUWORK consisted of only seven items. ACADM and SATIS were not represented in the new factors. Reliability tests for those constructs showed acceptable values. This reflected the high reliability of the measuring scales, since

each item must have contributed strongly to the overall consistency and produced high alpha coefficient values.

REPUT2, the new measure for reputation, consisted of REP1, REP2, WCON12, WCON14, WCON19 and WCON20. That is to say, ORGN2 and ORGN3, the two items that were included in REPUT (Jones, 1992a), were not included in REPUT2. ORGN2 and ORGN3 were heavily loaded on scientific and academic reputation. The reliability test confirmed that REPUT2 was a coherent construct, the coefficient alpha being 0.8935. I used REPUT2 as the measure of reputation and a coefficient correlations matrix was constructed which showed strong correlations between REPUT2 and INNOCLI, JOSAT, WKCON, MGTSTYLE, NATUWORK and PROMP and weak correlations with COMPY and PEERGROU. Multiple regression was then used to find the best explanation for reputation. REPUT2 was the dependent variable and all the eight revised factors were independent variables. The adjusted R-Squared was 52%. Stepwise analysis was then used to identify the main determinants of reputation. INNOCLI (innovative climate) and JOSAT (general job satisfaction) were the main ones with adjusted R-Squared of 44.7% and 4.2% respectively. Forward analysis confirmed that INNOCLI and JOSAT were the main determinants of internal reputation.

8.4 Reputation and the Original Constructs

I decided to examine REPUT2 with the original ten constructs and not simply proceed with the revised factors identified by principal components analysis for two reasons. First, the original constructs were based on proven scales which had been examined

before (Jones, 1992a) and been shown to be highly reliable. They exhibited coefficient alpha values above 0.8 for almost all the original constructs except PROM and ORGN. Those constructs contained most of the original items. Secondly, it was thought that the original constructs might provide a better explanation for reputation. It would be worthwhile to examine whether the original constructs would confirm the determinants of reputation identified by the revised variables resulting from factor analysis.

A correlation matrix was constructed for REPUT2 and the original ten constructs. Previous results were confirmed: REPUT2 correlated to all the constructs except PAY, PEER and SATIS. The independent variables were highly correlated at a significant level of 0.01. The multi-collinearity evident in the matrix was thought to be usual with this type of data and stepwise analysis was used to eliminate those variables which did not contribute to the explanation of reputation. Multiple regression analysis was used to examine REPUT2 with the original constructs. The adjusted R-Squared was 62%. Stepwise analysis identified INNO and JSAT as the main determinants of internal reputation with adjusted R-Squared of 51.4% and 7% respectively. Forward selection confirmed that INNO and JSAT were the main determinants of reputation.

The coefficient correlations matrix showed also that INNO, JSAT, WCON, MGT and WORK were the most strongly correlated variables. Therefore, in order to examine whether the data gave a better explanation for those five independent variables, multiple regression analysis was used, treating them as dependent variables. Five

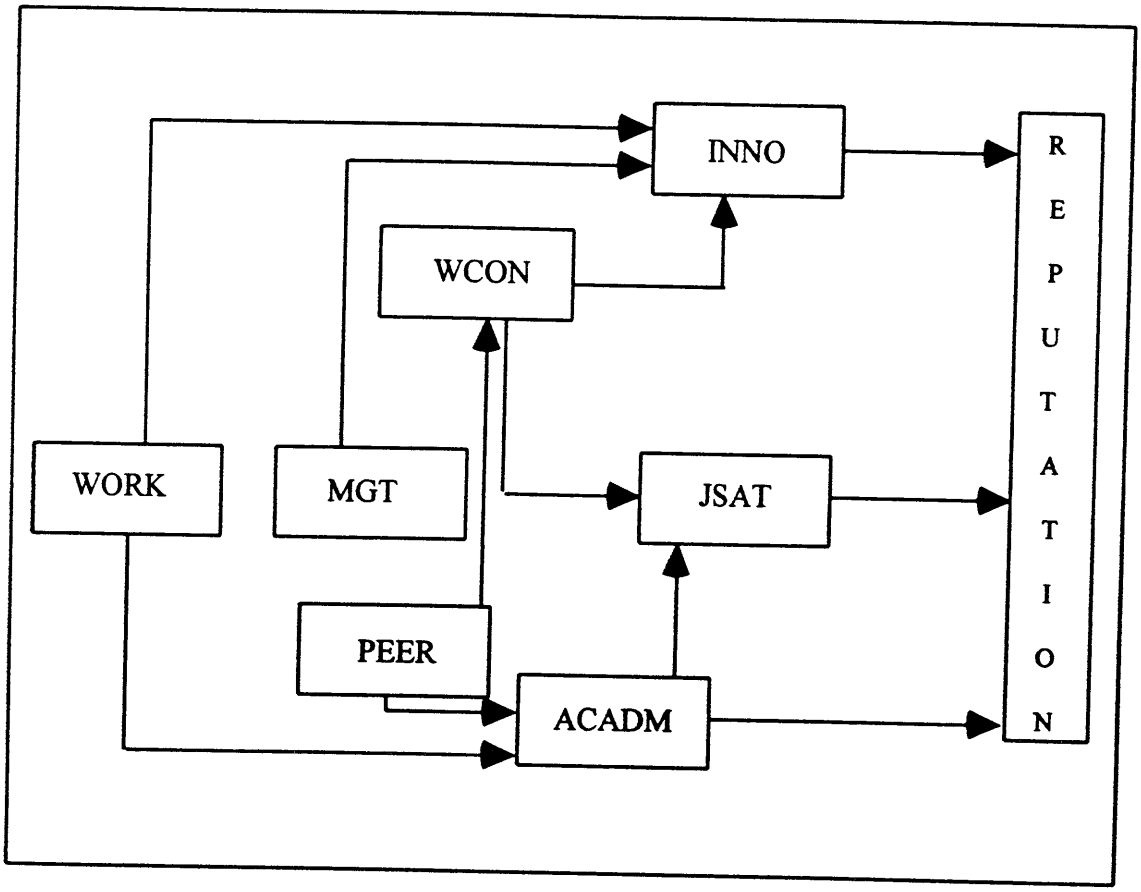
equations resulted. The independent variables did provide a better explanation for innovative climate and working conditions than for general job satisfaction and nature of work in comparison to reputation. This was clearly shown by the values of the adjusted R-squared: 74%, 71%, 56% and 55%. However, management style produced the same value of adjusted R-Squared as for reputation, i.e. 62%.

Stepwise analysis showed that innovative climate was the main explanatory variable to measure working conditions, management style and nature of work. Working conditions was the main explanator of innovative climate and general job satisfaction. General job satisfaction was the second main explanator of working conditions. Management style was the second main explanator of innovative climate. Reputation was the second main explanator of general job satisfaction and fourth of innovative climate and working conditions. Nature of work was the third explanator of innovative climate. Therefore, according to this model, reputation, innovative climate, working conditions, general job satisfaction, management style and nature of work were highly explanatory of one another, and very closely linked.

In chapter 7, I used path analysis to verify the relationship between the independent variables and reputation (REPUT2). As can be seen from figure 8.1 INNO, JSAT and ACADM were confirmed as the main determinants of reputation. However, path analysis also confirmed that WCON affected reputation indirectly via innovative climate and general job satisfaction, while MGT affected reputation via innovative climate only. WORK affected reputation via innovative climate and academic and scientific reputation. The technique of path analysis is useful in investigating the

relationships between the independent variables and the dependent variable. It identifies indirect as well as direct effects on the dependent variables. In summary INNO, JSAT and ACADM had a direct effect on reputation. WORK and MGT had an indirect effect via INNO. WCON affected reputation via INNO and JSAT. And PEER had an effect on WCON and ACADM which in turn affected JSAT.

Figure 8.1 Influences on Reputation



The final model of reputation was:

Reputation: INNO (51.4%), JSAT (7%), ACADM (2.3%), WCON (1%), the numbers in the brackets indicating the degree of explanation of the variance.

The reputation equation in Jones's study (1992a) identified innovatory climate (INNO) as the main factor in determining reputation, explaining 35% of the variance. In a later work, Jones (1996) established that innovatory climate and general job satisfaction were the main and second determinants of reputation. This confirmation of the main result, despite the cultural differences, seems to suggest that scientists may have some characteristics in common regardless of culture which are mainly a product of the nature of their work and of socialisation during the course of their study (Toren & King, 1982). On the other hand Lincoln and Kalleberg (1990) carried out a comparative survey of Japanese and US workers and found that there were substantial differences, both in work motivation and in the relationship between motivation and organisational structure in USA and Japan. This is an issue which needs to be investigated further in the future.

8.5 Reputation and Social Groups

In chapter 6 the hypotheses that there would be variations in responses according to age, sex, length of service, number of previous employers, educational qualifications and field of specialisation were tested. It was assumed that the older research scientists would rate reputation higher than younger ones and that longer-serving research scientists would rate reputation higher than shorter-serving ones i.e. age and tenure would be positively related to reputation. On the other hand it was assumed that reputation would be negatively related to the number of previous employers, i.e. who had had two, or three or more employers would rate reputation lower than those with no previous employer. PhD research scientists would rate reputation lower than those with a BSc; and finally men would rate reputation differently from women. The

analysis did not substantiate the propositions that reputation would be rated higher by older and by longer-serving research scientists. These conclusions seem to confirm those reached in the UK study as regards age and tenure. Both studies disproved the hypotheses, although the UK study found that age and tenure were negatively related to reputation. Younger scientists rated reputation higher in the UK but the Bahrain study did not indicate the direction of variation. This perhaps ought to be investigated more thoroughly in future research. The proposition that reputation would be negatively related to the number of employers was not substantiated; different groups rated reputation almost equally. The assumption too regarding the independent variables that would be linked to low reputation for research scientists with previous employment, namely MGT (managerial style), PAY, and PROM (promotional opportunities), was not supported. Analysis of variance (ANOVA) was used to identify the independent variables for which there was a significant difference according to tenure and number of previous employers. WORK provided to be the only independent variable for which there was a significant difference by reason of both age and tenure. Older and longer-serving groups rated WORK higher than the younger and shorter-serving ones. This result suggested that WORK became more challenging and interesting as scientists gained in experience.

Next I looked at the educational qualifications distribution (QUALDIS) and field of specialisation. It was assumed that the more qualified research scientists would rate reputation lower, that WORK would be rated higher by PhDs scientists than by BScs or MScs and that there would be variations in the responses from those with different specialisations i.e. sciences or social sciences. The analysis showed no significant

difference in the ratings of reputation between the PhD and BSc groups. So the proposition that more qualified research scientists would rate reputation lower was not substantiated. For two variables there were significant differences according to QUALDIS. PAY was rated highest by the BScs and WORK was rated highest by the PhDs. So, the propositions that WORK and PAY would be rated higher by PhDs were only substantiated for WORK and not for PAY. The results suggest that research scientists with higher qualifications were given work that was intrinsically more interesting and more demanding. The lower rating for PAY can be attributed to the fact that PhD holders had to keep up to a certain standard of living. Field of specialisation made no significant difference for reputation nor for the independent variables.

As regards the division between men and women, the analysis showed that there were no statistically significant differences in the ratings of reputation, only marginal variations. ANOVA identified only one variable, i.e. PAY, for which was a significantly difference between men and women. Women rated pay lower than men, showing their dissatisfaction. The proposition that women would be content with mundane tasks was also not substantiated since they rated WORK only marginally lower than men. As regards PROM, there was a marginal difference.

The investigation of the revised variables by ANOVA confirmed almost all the results for the original constructs, except for WORK, which was significantly different for those with different lengths of service with the original constructs but not with the revised constructs.

8.6 Reviewing the Literature and the Data

In attempting to develop a conceptual model of reputation I began by discussing what is referred to as the 'excellence' literature, particularly Peters and Waterman (1982). The importance of this literature lies in the fact that it attempts to identify the characteristics of excellent companies and incorporates aspects of human resource strategies. In the study by Peter and Waterman attitudes of individuals were researched and reported in an extremely unstructured and unrepresentative manner. This made it very difficult to use this literature to develop hypotheses regarding the likely determinants of organisational reputation. Capon et al (1991) used factor analysis to confirm that there was no relationship between organisational design and good financial performance in the data of Peters and Waterman. Therefore, the excellence literature did little to help identify the attributes that make some organisations better places to work than others. However, the marketing literature helped to focus on the nature of reputation more clearly. It was helpful in distinguishing the first two dimensions of reputation i.e. subjective-objective and internal-external. For instance, service in banks was perceived in very similar ways by customers and employees (Schneider et al, 1980 & 1985). External image or reputation as perceived by potential employees differs from image as perceived by customers, because potential employees, especially undergraduates and postgraduates, are unlikely to have had regular contact with the organisation in question (Jones, 1992a).

Kennedy (1977) and Abratt (1989) conflate the corporate image literature, which is based on comparisons with human personality (Newman, 1953), and the marketing

literature. Their models were useful in developing the concept of reputation, in particular, the idea that certain 'objective' company criteria become company policies which are 'perceived' by employees. In perceiving these policies and communications, the employees construct an image, or reputation. This internal image is then transmitted to external groups, so becoming external image. Objective company criteria are also the starting point for Abratt's model, which is considerably more complex than Kennedy's, linking corporate personality, identity and image. These criteria establish corporate identity and are then filtered through the image interface, this being the point where employees interact with external groups including the organisation's stockholders. The employees, therefore, in the models of both Kennedy and Abratt, act as a vehicle which transforms an internal image into an external one.

The commitment literature is useful in developing the concept of reputation. It seems reasonable to hypothesise that those employees who are most committed to an organisation rate reputation higher than the less committed. However, there is a contrast between reputation and commitment in that the former is an organisational attribute while the latter is a psychological construct. This is related to what Payne et al (1976) describe as 'affective' and 'descriptive' responses. Affective responses describe the individual's feelings about certain aspects of organisational life - the extent to which they are satisfied with their job for instance. A descriptive response on the other hand describes what certain aspects of an organisation are like - its climate or its reputation. In the present study the measure developed for reputation, REPUT2, contains the variable REP2, an objective reaction to the department's

reputation i.e. how other people in the department regarded its reputation. Therefore, it is believed that reputation is different from commitment and job satisfaction (affective attributes). In Kennedy's model, the determinants of image included pay structures, product attributes, work conditions, friendliness and training. These ideas in combination with a number of the independent variables used in commitment studies, were used in establishing the determinants of reputation.

The literature on labour economics was also useful in the investigation of human resources reputation. Here, reputation is regarded as being a function of implicit labour contract: sticky wages and flexible employment. In periods of decline firms will reduce the number of employees and maintain wage/salary levels (Okun, 1981). The theory was shown to hold true for R&D employees by Sullivan and Hogge (1987); nonetheless it was suggested that factors related to security of employment would not be a major determinant of reputation.

On the basis of the literature concerned with establishing an innovatory climate in R&D departments (Burns & Stalker, 1961; Jones & James, 1979; Siegel and Kaemmerer, 1978), and also on more recent literature of West and Farr (1990); Ekvall (1984 & 1993), innovatory climate was hypothesised to be the main determinant of reputation. As we saw in chapter 7 the hypothesis was supported by the data. Also the work of Kornhauser (1962); Cotgrove and Box (1970); Pelz and Andrews (1976); Raelin (1985); and Jones (1992a) was used to develop the second hypothesis, notably that job satisfaction would be the second most important factor in the determination of reputation. The hypothesis was supported (see chapter 7). The literature on which the

third hypothesis, that working conditions would be the third main factor in determining reputation, was based, was that of Pelz and Andrews (1976) about the importance of good communication policies in stimulating high scientific performance and of Goldberg and Kirchenbaum (1988) on the importance of a positive work-setting. The work of Hofstede (1980) which designates Bahrain as a collectivist culture in which training and physical conditions are regarded as important (Chapter 7, table 7.4, also appendix 5) also contributed. The data however, showed that work conditions were the fourth factor in the determination of internal reputation and accounted for only 1% of the explanation of the variance. However, path analysis showed that WCON affected reputation indirectly through INNO (see figure 7.2).

Based on the literature on professionalism (Raelin, 1985) and R&D management (Miller, 1986), the nature of work was hypothesised to be as the fourth most important factor in establishing reputation. As pointed out in chapter 7, the hypothesis was not supported by the data. The literature establishes quite clearly the importance of work to highly qualified employees. This relates to both the nature of work and the freedom to choose assignments. To explain why work was not more strongly associated with reputation, it was suggested that the model used was too heavily biased towards individual needs. Scientists are attracted to an organisation because of their desire for interesting and challenging work.

The work of Andrews and Farris (1976), Knorr et al (1979), Burns and Stalker (1961), and Hull (1988) was the source of the hypothesis that managerial style would be the

fifth most important factor in establishing reputation. As shown in Chapter 7, the data did not support this hypothesis. The idea that WORK and MGT would be the main determinants of reputation was founded on the basic idea that scientists desire interesting and challenging work, and need freedom from managerial interference to do that work. In fact MGT and WORK correlated less strongly with reputation than the four factors (INNO, JSAT, ACADM and WCON) identified by stepwise analysis as the main determinants of reputation. However, the fact that WORK correlated less strongly with reputation made it less likely that MGT would be strongly related to reputation. That is, if work itself is not the most important aspect of the relationship between scientists and their organisation, then it is unlikely that differences in the degree of individual autonomy will influence reputation. However, as was pointed out in chapter 7 WORK and MGT affected reputation indirectly through INNO; and this was confirmed by path analysis (see figure 7.2).

8.7 What is Reputation?

In this section the concept of reputation is looked at in the light of the results of the study. The main problem was to establish the determinants of reputation and to show that it existed separately from other concepts of organisational behaviour. Labour economics provided a basis for the research although it was thought that reputation was too narrowly defined in that literature to be useful in a wider sense. Earlier it was claimed that reputation had been used in literature to describe a number of factors related to organisational behaviour. For instance, reputation refers to a company's image (Olins, 1978); signals the firm's key characteristics to constituents (Spence, 1974); may impede management's response to environmental change (Caves &

Porter, 1977); helps increase the compliance of existing employees (Kreps & Spence, 1985); determines the organisation's response to unforeseen contingencies (Weigelt & Camerer, 1988); and is a form of normative control (Fombrun & Shanley, 1990). This confirms that variables having similar names do not necessarily imply conceptual or operational agreement (Pennings, 1973). Next it was necessary to clarify the notion of human resources reputation. This led to some difficulties, in particular, the reputation -job satisfaction overlap. However, this is not particularly unusual in a study of organisational behaviour. For example, 'climate' overlaps with many other constructs (Glick, 1985). However, in this study it is believed that reputation has been justified both 'logically and empirically' as a concept distinct from job satisfaction.

In this study the investigation of organisational reputation has been viewed primarily from the employees' perspective. Internal reputation has been the main focus. Internal and external reputation are very closely linked. Schneider et al (1980 & 1985) established that there is a strong congruence between internal and external perceptions. The marketing literature confirms that external image follows internal image and the main agents of transmission are company employees (Kennedy, 1977 & Abratt, 1989). The thesis has not really illuminated that relationship to any great extent, nor was it ever intended to do so. The other dimension of reputation, i.e. the subjective-objective dimension, appears to be less problematic. Abratt (1989) believes that visible artefacts such as architecture, technology and layout influence corporate image and identity; but they are filtered through the norms and values of employees. Kennedy (1977) suggests that objective criteria - pay structures, product

attributes and dividends - combine with subjective data such as working conditions, friendliness and training to create the organisation's image. Dowling (1986) supports this view: he finds that all objective data are screened by the employees' value system, so that objective factors become subjective reality. Kennedy agrees that information is interpreted by individuals according to their needs and that data are therefore perceptual not factual. The present study is based on data which might be regarded by some as factual, since it measures the rating of the various attributes according to a Likert type scale which gives it an authority which may not be apparent if the data were more subjective. However, the study has been concerned with the measurement of opinions rather than the collection of facts. Therefore, the data can only be regarded as perceptual. Support for this can be drawn from Schneider and Bowen (1985), who responded to criticism that perceptual data were inherently subjective (Payne & Pugh, 1976). They believe that understanding of organisational behaviour comes through members' perceptions of those organisations and their practices. Organisations are established on the collective behaviour of human beings and to understand organisations it is necessary to rely on perceptual, that is subjective, data. Easingwood and Mahajan (1989) by contrast regard image or reputation as something that is based on solid, indisputable 'facts'.

Such ambiguities do not undermine the present work. Other areas enquiries into organisational behaviour have suffered from similar difficulties (Jones, 1992a). For example, Abratt (1989) finds that despite a 'voluminous literature' the nature of corporate image remains unclear. Organisational commitment has been defined and measured in a variety of ways (Guest & Dewe, 1991; Angle & Perry, 1986; Bateman

& Strasser, 1984). This shows that there is a lack of consensus about the antecedents of concepts which are widely used in OB. Therefore, it was not to be expected that this study would provide a definitive explanation of organisational reputation. It was intended to be exploratory, showing that reputation is a distinct and functional addition to the concepts used in organisational behaviour. I have shown, by confirming the data collected by Jones (1996) on the determinants of internal reputation that, despite the culture differences, reputation is a distinct concept and an additional function in OB. In my study INNO and JSAT have been identified as the main determinants of internal reputation, just as was the case in Jones's study (1996) in the UK. I have discussed the cultural differences and their effect in Chapter 7 (see also appendix 5).

Factor analysis confirmed that the dimensions of reputation are related to whether individuals think the department is a good or bad place to work and to how they think it is regarded by their peers. Other dimensions that determine reputation are the extent to which organisational policies are applied within the research department; the department's image in the organisation as a whole; the morale of the department; and its rate of productivity. The main determinants of internal reputation are innovatory climate and job satisfaction.

8.8 Limitations of the Research

One major limitation has been the need to rely on statistical tests of significance in the data analysis. Atkins and Jarret (1989) point out that tests of significance have become vital in the social sciences, as they provide an objective way of drawing

conclusions from quantitative data. Such tests appeal to social scientists because this objectivity gives the results an impression of being value - free. This is clearly linked to the goal of achieving 'scientific' credibility for the social sciences by producing results which are generalisable. They believe that reliance on tests which demonstrate statistical significance undermines the 'healthy scepticism' of social scientific results. They suggest the way in which such tests are used is inappropriate to the social sciences. In particular, they focus on the meaning such results have in terms of furthering an understanding of the differences between social groups. Atkins and Jarret doubt the usefulness of tests of significance for a number of reasons. First, the null hypothesis states that there is no difference between the groups. The means of the samples are known, but on the assumption of a normal distribution and a random sample, t-tests are used to estimate the likelihood that the sample is representative of the population. A probability of 0.01 or 0.001 is conventional in establishing the level of significance. Also, the null hypothesis presents a problem in that the chances of two social groups having means of exactly zero are very small. The use of large sample sizes increases the likelihood that the null hypothesis will be rejected.

Random samples are rare in the social sciences and the assumption that the sample is random and drawn from a population with a normal distribution is problematic. In many studies in social sciences the data generated from the study of totally unrepresentative samples are used to make generalisation about the population at large. The present study is not free from that criticism. However, such short-comings are difficult to avoid in the study of OB. For example, although Buchanan, Boddy and McCalman (1988) acknowledge the need for the sample to be representative and

uniform, they point out that field work usually produces a conflict between the theoretically desirable and the practically possible.

Some research scientists refused to participate in the present survey mainly I believe, because they believed that the data might be used against them. Studies of this kind are always looked at with some suspicion. However, as stated earlier, the questionnaire was distributed to all 220 research scientists in the governmental organisations and 163 responded, a response rate of 74% which can be regarded as reasonably representative and satisfactory. And I believe the results show that a proper scientific method has been followed in the analysis.

The study relied totally on aggregated data. That is, in order to establish the antecedents of reputation an aggregation of individual perceptions was used. As stated earlier, there is a considerable debate in the literature about the legitimacy of aggregating individual perceptions to demonstrate an organisational attribute. Much of this debate is centred on the work of Drexler (1977) who claimed that over 42% of the variance in the perception of climate was accounted for by the organisation. A number of writers accept that Drexler's study justifies the use of aggregated perceptions to describe organisational climate (Jones and James, 1979; Roberts et al., 1978). James (1982) agrees that aggregated perceptions can be used to identify an organisational attribute, although he finds that Drexler gives an inflated estimate of the degree of agreement among individuals. Payne et al. (1976) suggest that when examining organisational attributes such as climate, it is important to differentiate between affective and descriptive responses. Angle and Perry (1986) believe that

individual responses can be aggregated into organisational attributes as long as high levels of construct reliability are demonstrated. Therefore, in this study the reliability of each construct (independent variable) was assessed using Cronbach's (1951) alpha coefficient, which is based on the "internal consistency" of a variable. Coefficient alpha measures the average correlation of items within a test (Norusis, 1986, p B206), and the following figures were established for the main variables: alphas of 0.8935, 0.8316 and 0.8152 respectively for REPUT2, JSAT, and INNO. There is substantial agreement that aggregating a purely individual sentiment such as job satisfaction is generally unsatisfactory. However, Jones (1992a) argued that the justification for using measures of psychological constructs like job satisfaction was that the data had not been aggregated to establish a measure of organisational morale. Affective constructs such as job satisfaction were used to establish their relationship with a descriptive response to internal reputation. In the present study the attempt was made to identify the individual responses most consistently related to reputation and not to establish the level of job satisfaction nor the extent to which individual departments had, or did not have, an innovatory climate.

8.9 Future Research

Jones (1992a) recommended in his study that reputation as a dependent variable should be operationalised by means of a more comprehensive construct. In chapter 5 principal component analysis was used to establish that reputation did consist of items additional to REP1 and REP2. The additional four items are WCON12, WCON14, WCON19 and WCON20. For completeness the relevant questions are quoted below:

WCON12R	Are organisational policies consistently and fairly applied within the department?
WCON14R	Do you think the research department has a good image in the organisation in general?
WCON19R	How would you describe the morale of the department?
WCON20R	How would you rate the productivity of the department?
REP1	How would you describe the department's reputation, i.e. is it a good or a bad place to work?
REP2	How do you think most other people in the department regard its reputation?

Although these items give a wider perspective to the concept of reputation and the original independent variables provide a high degree of explanation of REPUT2 (62%), I tend to agree with Jones that a better conceptualisation of reputation and hence a more powerful operationalisation of the concept would provide a stronger defence against criticism. Any further research into reputation should, therefore, include questions such as those below:

- Does working in this department encourage employees to do their best ?
- Do employees in this department think that they are well treated ?
- Does working in this department have a favourable influence on the attitude of employees to work ?
- Do employees think that there could not be a better department than this in which to work ?
- Within the department, is employee welfare considered to be important?
- Would you choose to work in this department if you had the choice again?
- Would you recommend this department to a close friend or relative?

In Chapter 7, section 7.4 (Comparison of Results) it was suggested that the question of cultural differences should be investigated further. When the results of the Bahrain study and the UK study were compared there was a wider measure of agreement than of disagreement (see table 7.5), in the perceptions of the scientists in the two countries. This raises doubts about the extent to which there might be differences because of culture. I think the explanation is twofold: first, this group of professionals may share a culture created by the nature of their work, which is highly scientific and mentally more demanding than that of other employees. They have gone through more or less the same training and curricula. The majority of Bahrainis (45%) who are graduates and post graduates studied at US & UK universities (Statistical Abstract, 1992). No matter where they are, they have been deeply affected by the experiences they had during their studies (Toren & King, 1982). Hofstede (1991) defines culture as the collective programming of the mind which distinguishes the members of one group or category of people from another. Culture is learned, not inherited. It derives from one's social environment, not from one's genes (Hofstede, 1991, p5).

Secondly, the questions related to culture were asked of Bahraini scientists but not of the UK scientists in Jones's study of reputation. Therefore, for comparison purposes use has been made of a study by Hofstede (1980) of IBM employees in fifty three countries across the world, amongst which were Britain and a group of Arab countries (see appendix 5). Four dimensions of culture were discussed in this study and countries were classified according to whether they had individualist or collectivist, small or large power distance, masculine or feminine, weak or strong uncertainty

avoidance cultures. This classification only allowed an indirect comparison to be made, which served as indication only, since the responses of the Bahraini scientists had to be measured differently to the method used in the above study and I had to rely on average responses which were compared with the indexes in the Hofstede study. Therefore, I think a further investigation into the issue of cultural differences needs to be carried out using a more direct method of comparison.

It is also believed that some differentiation between organisational cultures would have assisted in the explanation of reputation. Culture is certain to intervene between the objective organisational criteria and an individual's perception of that organisation. I believe that for a fuller explanation of the concept of reputation further research needs to be carried out involving professionals from other sectors in Bahrain. The professionals employed in the universities, national oil companies and the private sector would serve very well.

The present study has provided strong indications that the national culture of Bahrain is, according to the Hofstede criteria, a high PDI, low IDV, low MAS, and high UAI culture, of a type that has been associated with low R&D productivity (Kedia et al, 1992). For example Kedia found that R&D effectiveness was associated with organic organisational structures, which mean that the sharing of power and hence a low PDI should be associated with higher R&D effectiveness. And high masculinity cultures are associated with a strong commitment to individual achievement and should be associated with high R&D productivity. On the other hand, the results have emphatically shown that the perceptions of the scientists in the research organisations

in Bahrain of the internal reputation of their respective departments are primarily determined by innovatory climate. Innovatory climate in research organisations has been associated with effectiveness (Abbey & Dickson, 1983) and related to organic characteristics of organisations (Burns & Stalker, 1961). Therefore although the national culture of Bahrain is indicative of a mechanistic bureaucratic structure, the perceptions of the research scientists is that the innovatory climate which is characteristic of organic organisations is essential for the internal reputation of the organisation. This could have certain implications for the management of research scientists in Bahrain in that a strategy of combining both mechanistic bureaucratic and organic organisational approaches might with advantage be adopted. I propose the adoption of the extended Thompson (1967) model by Spender and Kessler (1995) as a topic for further investigation.

The study indicates that a number of areas would be suitable for future research:

1- The implications of reputation for improved levels of individual and organisational performance.

2- An examination, using principal components analysis, of reputation after the addition of the questions above to REP1, REP2, WCON12, WCON14, WCON19 and WCON20; and an examination through multiple regression of whether the same or different explanators for reputation resulted.

3- A similar comparative study of research scientists in the universities in Britain and Bahrain. The questions of Hofstede on organisational culture should be included in the Jones (1992a) questionnaire and the results compared with the results of this study, with a view to testing the proposition that cultural differences have no effect on the perceptions of scientists.

4- Innovatory climate and job satisfaction have been identified in my study as the main determinants of reputation. A further study should be conducted to identify their main determinants to help the research departments understand how to improve their department's innovative environment and the job satisfaction of the research scientists.

5- Jones (1996) suggested further investigation of the divergence of reputation and organisational commitment. Literature has indicated that older employees are highly committed to their work. In the UK the ratings of the older employees were negatively associated with reputation. In my study I found only a marginal difference in the groups' rating for reputation. In other words employees who become more committed to their employer at the same time as becoming increasingly disillusioned about the organisation are unlikely to be highly motivated. It is suggested that this divergence may explain the phenomenon of research scientists becoming plateaued in mid-career (Gerpott and Domsch, 1987; Hall and Louis, 1988; Slocum et al., 1985). Improving the creativity of the more experienced research employees could have a significant impact on organisational performance (Jones, 1996). Therefore, I suggest that this phenomenon be further studied.

6- An investigation of the effectiveness of adopting the extended Thompson model (1967) in a situation where both organic and mechanistic structures exist e.g. in Bahrain.

8.10 What has been achieved?

Good internal reputation is important for an organisation and the welfare of employees working in it. Therefore, establishing the determinants of internal reputation and identifying the factors that affect those determinants is crucial, especially given that those factors can be are expected to throw light on the employee/employer relationship. In this research some of the objectives have been achieved and some have not. However, I believe that this research has been worthwhile in that it has tackled an issue which has not been researched in Bahrain, namely the perception of research scientists of the internal reputation of their place of work. The research has supported to a large extent the results of similar studies by Jones (1992a & 1996) which attempted to establish that the concept of reputation was a distinct construct such as job satisfaction and working conditions. This is useful for studying the relationship between scientists and their organisations and for the implications it could have for the management of such people.

In the methodology chapter I suggested that the Bahraini scientists' perceptions of their place of work might be different from those of the British scientists given the cultural differences between Britain and Bahrain. But the results did not show substantial differences. In the section on future research (section 8.9) I attempted to explain this. Innovatory climate was shown to be the main determinant of internal

reputation in both countries. In the Bahrain study it accounted for 51.4% of the explanation of the variance and for 35% in the UK study, confirming what was said in the literature discussed in chapter three on the importance of an innovatory climate for scientists, namely that it established an environment in which they believed that they could work creatively, be free to use different methods of looking at problems and be encouraged to develop new ideas. Job satisfaction was established as the second main determinant of reputation in the present research and Jones's study (1996), accounting for about 7% of the explanation of the variance in both.

It was hypothesised that there would be differences in the rating of reputation by different social groups. Age and tenure were expected to be positively related to reputation, while the number of previous employers was expected to be negatively related. Also, it was expected that there would be variations according to sex, academic qualifications and field of specialisation. The results did not reveal any statistically significant differences in the rating of reputation by groups of different ages, lengths of service, numbers of previous employers, sex, academic qualifications or fields of specialisation. However, one independent variable was significantly related to age, tenure and qualifications i.e. WORK. The older, longer-serving and more highly qualified research scientists rated WORK significantly higher than the younger and less-qualified. This, as mentioned earlier, suggests that work becomes more challenging and interesting as scientists gain in experience. PAY was the other independent variable that was significantly related to qualification (QUALDIS). The higher qualified (PhDs) rated PAY lower than the less qualified (BScs). This result contradicted the literature; for example Pelz and Andrews (1976) concluded that PhDs

rated PAY higher than the less qualified, indicating a period of financial stability. The lower rating of PAY amongst Bahraini scientists was attributed to the desire to maintain a certain standard of living.

Path analysis technique (chapter 7) was used to verify the relationship between the independent variables and reputation (REPUT2). INNO, JSAT and ACADM were confirmed as the main determinants of reputation. Path analysis was useful in confirming that WORK and MGT had an indirect rather than a direct effect on reputation via INNO. It was also confirmed that WCON affected reputation indirectly via innovative climate.

I believe that this study has made a worthwhile addition to the literature on organisational behaviour. The work of Jones (1992a & 1996) on establishing reputation as a distinct construct in its own right has been confirmed by my study in a different cultural setting.

8.11 Implications for Management of Research Scientists

It was pointed out earlier that the term reputation emerged from labour economics and was linked to implicit contract theory. The human resources management (HRM) literature (Kanter, 1983) mentions reputation, but in a generally unsatisfactory way. The present study has used a combination of principal components analysis and multiple regression to establish the existence of reputation and to identify its determinants. The analysis of the data has clearly shown that internal reputation exists as a distinct concept and has established that it is determined mainly by

innovative climate and job satisfaction. The analysis has also shown that academic and scientific reputation and working conditions are minor determinants of reputation.

One important question arises here. Can any practical implications be drawn from the above results for the management of research scientists in research organisations in Bahrain? In the introduction one of the objectives of the study of internal reputation was said to be that it might have practical implications for the management of research scientists.

In the following section each factor identified in the model of reputation, i.e. innovatory climate, general job satisfaction, academic and scientific reputation and working conditions, will be discussed to see whether conclusions can be drawn for practical management.

Innovatory Climate

The strong links between climate and job satisfaction and departmental reputation established by this research have implications for the management of research scientists in so far as it is obviously difficult to provide good career prospects for large numbers of highly qualified professionals, even though many organisations have introduced "dual ladders" with managerial and professional tracks to minimise the adverse effects of restricted opportunities for promotion. Raelin (1991) is particularly convinced that the dual ladder has the greatest potential for resolving the classic need of professionals for autonomy, discretion, and participation in professionally-based organisations. Organisational innovation can be looked on as an interaction between

strategy and structure (Nystrom, 1990). Structure emphasises organisational stability while strategy emphasises innovation and change. Therefore, a favourable company culture and climate for achieving successful innovation is viewed as one of the most important resources (Nystrom, 1990, p144).

Managers in research departments must make sure that the climate is in keeping with research activities and a good department reputation by paying attention to the working environment. Innovatory climate is an environment in which research scientists believe that they can work creatively, are free to use different methods of looking at problems and are encouraged to develop new ideas. Miller (1986) also points out the intrinsic satisfaction to be gained from the freedom to pursue research interests. He goes on to say that organisations must establish environments in which the individual's growth and development are important. The need to establish an innovatory climate in research departments has a strong tradition in the literature (Burns and Stalker, 1961; James and Jones, 1974; Jones and James, 1979; Siegel and Kaemmerer, 1978). More recent examples include Tushman and Moore (1988), West and Farr (1990), Ekvall (1984 and 1993) and Nystrom (1990). In addition, both Porter (1985) and Twiss (1992) identify links between a reputation for innovation, the recruitment of creative people and creativity and innovation within the organisation. Raelin (1991) regards the challenge provided by interesting and varied work as the main motivation for professional employees.

Job Satisfaction

Overall job satisfaction has been defined as the worker's affective response to the total work situation (Mottaz, 1985). There appears to be a strong correspondence between work-related values and job satisfaction. Better performers reported significantly greater fulfilment and satisfaction in a study by Porter and Lawler (1968). Mottaz (1985) states in his study that job redesign is important for work satisfaction by enhancing the richness of the work experience and the importance of intrinsic rewards. Job redesign involving job enlargement and enrichment is aimed at constructing more meaningful, challenging and interesting jobs.

The literature dealing with professionals in organisations has long identified the need for work which is intrinsically satisfying (Kornhauser, 1962; Cotgrove & Box, 1970; Gouldner, 1957; Pelz & Andrews, 1976). Also Raelin (1985) identifies a number of factors which are crucial to professionals in organisations. Among these is job challenge which is related to the intrinsic satisfaction that comes from the vertical expansion of work tasks. Miller (1986) also identifies the intrinsic satisfaction to be gained from work as crucial to R&D professionals. Managers in research organisations, therefore, should analyse the relevant variables in their specific setting before establishing new policies, structures, or procedures designed to promote job satisfaction (Waneta, 1987). Creating an innovatory climate which provides employees with increased opportunities for job satisfaction is important (Jones, 1996).

Academic and Scientific Reputation

The model of reputation discussed in chapter 7 (path analysis, figure 7.2) showed that ACADM correlated satisfactorily with reputation (Beta Coefficient of 0.245). And the stepwise equation for REPUT2 showed that ACADM was the third most important determinant of reputation, contributing 2.3% to the explanation of variance. Therefore, the perception by scientists of the academic and scientific reputation of the department as a factor contributing to internal reputation should be capitalised on by management, which should assist scientists to establish scientific reputations through the encouragement of team-work and the exchange of new ideas for problem solving and publication.

Working Conditions

An agreeable work-setting is important for establishing strong organisational attachment amongst scientists (Goldberg and Kirschenbaum, 1988). In particular, good communication policies are crucial in stimulating 'high' scientific performance (Pelz & Andrews, 1966). Organisations need to find out what job-related rewards are desired and what the individual currently sees as the consequence (positive or negative) of his putting forth a high level of effort in his job (Porter and Lawler, 1968). Work rewards are viewed as resulting from the interaction of the individual with the task itself, with fellow workers, and with the organisation (Mottaz, 1985). An organisation can obtain systematic feedback on how its actions, particularly with respect to rewards and motivation, are being received. Organisations must be able to discriminate between good and poor performance in all jobs, must have the resources available to provide appropriate rewards, and must be willing to follow through and

dispense them. For example, pay is seen as a satisfier of a number of needs. Since my study found that PhDs and MScs were less satisfied with their pay management should be concerned to ensure the right psychological impact with the raises they give.

In my model of reputation, working conditions were identified as affecting reputation indirectly through the innovative climate of which it was the main determinant (Table 5.18). Path analysis confirmed this, since the path between WCON and reputation was insignificant (0.08) but the link between WCON and innovatory climate had a strong Beta Coefficient of 0.336. Therefore, managers of research departments should make sure that the climate is contributing to the research activities and a good reputation by paying attention to the working environment. This includes the physical working conditions, which can have a profound effect on the way in which the individuals perform their jobs; communications policies, which are crucial for stimulating high scientific performance; the goals and objectives of the department and the degree to which scientists are committed to those goals; and the availability of financial, human, and material resources.

Thus the study has brought out a number of practical implications for the management of research scientists in organisations in Bahrain. Establishing an innovative climate in the organisations appears to be central to the creation of job satisfaction and a good internal reputation. Providing good working conditions, opportunities to take on more challenging tasks that facilitate individual development and growth, and the establishment of a good scientific and academic reputation, are issues that must be

considered if the level of motivation of the research scientists and their performance are to be improved.

8.12 Summary

This chapter has mainly been concerned with presenting the conclusions to be drawn from the present study, some implications for the management of research scientists, and recommendations for future research.

In section one a brief description of the study sample showed that it is representative of Bahraini scientists. In the second section the reliability of the constructs other than PROM and ORGN was confirmed. These two constructs were examined by principal components analysis. PROM was shown to be a coherent construct and was used in its truncated form while ORGN was replaced by two factors, ACADM and SATIS. This increased the number of independent variables to ten. Section three dealt with the identification and justification of REPUT2 as a measure of internal reputation with a reliability coefficient of 0.8935. It consisted of the factors: REP1, REP2, WCON12, WCON14, WCON19 and WCON20. Multiple regression showed that INNOCLI (innovative climate) and JOSAT (general job satisfaction) were the main determinants of REPUT2 when used with the revised constructs; they accounted for 44.7% and 4.2% of the variance respectively. In section four REPUT2 was examined with the original constructs. Regression analysis showed an adjusted R-Squared of 62% and stepwise analysis identified INNO and JSAT as the main determinants of reputation, accounting for 51.4% and 7% of the variance respectively. The final model of internal reputation arrived at is:

Reputation: INNO (51.4%); JSAT (7%); ACADM (2.3%); WCON (1%).

In section five the results of examining the propositions that there would be variations in the responses of different social groups according to age, sex, length of service, number of previous employers, educational qualifications and field of specialisation were presented. The analysis using ANOVA showed that there were not significantly different ratings between the social groups. The proposition that older, longer-serving scientists would rate reputation higher than the younger ones was not substantiated. There was a significant difference in the rating of WORK according to both age and tenure. The proposition that number of employers would be related negatively to reputation was not supported. Nor was the proposition that PhD research scientists would rate reputation lower. PhDs rated WORK significantly higher than MScs and BScs but rated PAY lower. The propositions that reputation would be differently rated by males and females and that females would rate WORK and their promotion opportunities lower than males were not supported.

Section six examined the literature that was used for developing the hypotheses in the light of the results of the study. In section seven it was shown that reputation is a distinct concept related to organisations. Factor analysis confirmed that the dimensions of reputation were related to whether individuals thought the department was a good or bad place to work and how they thought it was regarded by their peers. In section eight the limitations of the techniques used in the analysis of the data were discussed, one major suggested limitation being reliance on statistical tests of significance for an understanding of differences between social groups, given that the

null hypothesis states that there is no difference between groups. Another reason is the assumption of a normal distribution and a random sample, which are rare in social sciences. Moreover, the study relies totally on aggregated data and there is a considerable debate in the literature about the legitimacy of aggregating individual perceptions to represent an organisational attribute (reputation). In section nine suggestions for future work on the concept of reputation were presented, together with the suggestion that the adoption of a mixture of organic and mechanistic structure in research organisations in Bahrain should be considered.

Section ten outlined what has been achieved by the present study and concludes that its findings make a worthwhile addition to the literature on OB, and confirm the work of Jones (1992a & 1996) on establishing reputation as a distinct construct in its own right. In section eleven the factors identified as the determinants of internal reputation, namely innovative climate, job satisfaction, working conditions, and academic and scientific reputation, were considered with a view to arriving at some practical suggestions for the management of research scientists. Establishing an innovative climate in research organisations appears to be central to job satisfaction and the establishment of a good internal reputation. At the same time the provision of good working conditions and of opportunities for staff to take on more challenging tasks encouraging individual development and growth and establishing a good scientific and academic reputation, are matters that must be considered if research scientists are to be motivated and their level of performance raised.

Appendices

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Appendix (1)
A Survey on the Research Infra-Structure in Bahrain From 1987 Through 1991

Due to scarcity of dependable information and statistics about the governmental research departments in Bahrain, I carried out a survey for the period 1987-1991, to establish the following:

- The infrastructure for research.
- The departments involved with research.
- The numbers, title and the qualifications of research scientists.
- The availability of libraries, numbers of books and periodicals and laboratories.
- The numbers of research studies carried out.
- The total expenditures on research.

Methodology

I designed a questionnaire for the survey and started interviewing the managers of those institutions to give them an idea about the aims of the survey before giving them the questionnaire.

There were two problems I faced while distributing the survey questionnaire: first, the diversity of definitions of research; and second, inaccurate statistics for expenditure on research. Most of the managers said that spending on research was part of the budget of the department, of which research was not the only activity. Such people could not give exact figures and some for the sake of confidentiality did not respond at all.

Results of the Survey

The results of the survey are summarised in the tables (1 through 4). The analysis of these results is given in chapter 2 under the appropriate headings.

Questionnaire

1- Organisation Name:_____

2- Department Name:_____

3- Occupation of the person responsible:_____

4- Type of the activity of the scientific research:

Problem solving:_____ Development:_____
Service: _____ Production: _____
Others (specify):_____

5- Is the scientific research:
Basic activity for the department:_____
Secondary activity for the department:_____

6- The scientific research done upon:

Stated plan:_____ Sudden order:_____

7- What is the budget for the studies/Research for the years:

1987	1988	1989	1990	1991

8- If there is no specific budget as requested in Q.7 what is the budget allocation for the items below as applicable to research scientists, their assistants and their technicians:

	1987	1988	1989	1990	1991
Salaries					
Training					
Machines and Equipment					
Laboratory					
Printing					
Other (specify)					

9- The number of the research scientists:

Year	Number of Research Scientists Bah. Non Bah.	Employment's Title	Qualification
1987			
1988			
1989			
1990			
1991			

10- The number of the studies/researches produced during the years:

1987	1988	1989	1990	1991

11- Do you have a laboratory?

No of laboratories	Date of Establishment

12- Do you have a specialised library?

Year	No of Books	No of Periodicals
1987		
1988		
1989		
1990		
1991		

Tables of Results:

Table (1): Total Number of Laboratories, Books, and Periodicals During 1987-1991

Research Department	1987			1988			1989			1990			1991		
	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls
Historical Department	-	1700	300	-	1750	300	-	1830	300	-	2020	300	-	2060	300
Al-Areen Wildlife	-	588	2	1	674	2	1	720	3	1	795	3	1	964	3
Organising and Labour Force	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Educational Research and Development	-	*	*	-	*	*	-	*	*	-	*	*	-	625	116+ 25#
Educational Evaluation & Curricula Development Research	-	*	*	-	*	*	-	*	*	-	*	*	-	*	*
Total	-	**2288**	**302**	**1**	**2424**	**302**	**1**	**2550**	**303**	**1**	**2815**	**303**	**1**	**3649**	**419+ 25#**

* Not declared.
\# Others.

Table (1 Cont'd): Total Number of Laboratories, Books, and Periodicals During 1987-1991

Research Department	1987			1988			1989			1990			1991		
	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls	Labs	Bks	Perls
Environmental Protection	2	*	*	2	*	*	2	*	*	2	*	*	2	*	*
Evaluation & Economic Researches	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fisheries	3	*	*	3	*	*	3	*	*	3	*	*	4	124	10
Agriculture Researches	1	1550	32	1	1582	32	2	1614	32	2	1646	32	2	1678	32
Economic Researches	-	279	*	-	540	*	-	772	*	-	932	*	-	3600	60
Bahrain Centre for Studies & Research	1	724	203	1	382	221	1	414	196	1	443	200	1	505	190
Total	**7**	**2553**	**235**	**7**	**2504**	**253**	**8**	**2800**	**228**	**8**	**3021**	**232**	**9**	**5783**	**292**
Total	**7**	**4841**	**537**	**8**	**4928**	**555**	**9**	**5350**	**531**	**9**	**5836**	**535**	**10**	**9432**	**711+25#**

* Not declared.

Table (2): Total Number of Full Time Research Scientists During 1987-1991

Research Department	1987		1988		1989		1990		1991	
	Bah	N. Bah	Bah	N. Bah	Bah	N. Bah	Bah	N. Bah	Bah	N. Bah
Historical Documents	2	-	2	-	2	-	2	-	2	-
Al-Areen Wildlife	*	*	*	*	2	2	3	-	2	-
Organising and Labour Force	6	3	6	4	8	6	8	6	10	5
Educational Research and Development	-	1	-	1	2	1	2	1	2	1
Educational Evaluation & Curricula Development Research	5	1	5	1	5	-	5	-	8	2
Environmental Protection	7	3	7	3	7	3	8	2	7	1
Evaluation & Economic Researches	3	-	3	-	3	-	4	-	4	-
Fisheries	6	1	6	1	6	1	6	1	7	1
Agricultural Researches	5	4	5	4	6	4	13	8	13	8
Economic Researches	*	*	5	-	5	-	5	-	13	-
Bahrain Centre for Studies & Research	16	3	17	2	17	2	16	3	16	4
Total	**50**	**16**	**56**	**16**	**63**	**19**	**72**	**21**	**84**	**22**

*Not declared. Bah: Bahraini. N. Bah: Not Bahraini.

Table (3) : Total Number of Studies/Researches Achieved During 1987-1991

Research Department	1987	1988	1989	1990	1991
Historical Documents Centre	4	5	5	6	6
Al-Areen Wildlife Sanctuary	-	-	-	1	1
Organising and Labour Force	*	*	*	*	*
Educational Research and Development	-	2	-	1	1
Educational Evaluation & Curricula Development Research	8	3	8	14	13
Environmental Protection Committee	4	5	5	4	6
Evaluation & Economic Researches	#	#	2+#	3+#	5+#
Fisheries Directorate	20	24	21	23	25
Agriculture Researches Directorate	10	10	12	12	13
Economic Researches Directorate	*	*	*	*	*
Bahrain Centre for Studies and Research	9	4	4	6	8
Total	55	53	57	70	78

\# Internal Reports.

* Not declared.

Table (4) : The Total Expenditures on Research During 1987-1991 (Bahrain Dinars)

Research Department	1987	1988	1989	1990	1991
Historical Documents Centre	*	*	*	*	*
Al-Areen Wildlife Sanctuary	6,200	8,450	13,700	11,400	10,385
Organising and Labour Force	150,347	152,025	205,770	221,877	204,931
Educational Research and Development	-	63,600	63,570	79,340	85,220
Educational Evaluation & Curricula Development Research	*	*	63,690	61,190	119,737
Environmental Protection Committee	*	*	*	*	*
Evaluation & Economic Researches	*	*	29,000	28,000	334,000
Fisheries Directorate	10,000	9,000	8,000	7,000	5,000
Agriculture Researches Directorate	260,000	279,000	310,000	333,000	368,000
Economic Researches Directorate	5,000	7,000	5,000	5,000	7,000
Bahrain Centre for Studies and Research	641,596	595905	730,784	860,185	749,926
Total	1,073,143	1,114,980	1,429,514	1,606,992	1,884,199

Bahrain Dinar = 2.65 US Dollar

* Not declared.

Statistical Abstracts, Administrative & Financial Affairs Department, BCSR, 1994.

Appendix (2)

Interviews Questionnaire

I carried out some semi-structured interviews with research scientists and their supervisors in various research departments and posed the following questions in order to identify in a preliminary way what problems they faced while carrying out their duties. This I hoped would throw some light on their attitudes and help me in formulating the research hypotheses.

Q1- What are the origins of research in Bahrain and how has it developed?

Q2- Being a supervisor/research scientist, what kind of problems do you face and what are the obstacles?

Q3- What do you think of the style of management of research in your department and what obstacles do you face?

Q4- Are there difficulties in obtaining information and what are the obstacles?

Q5- As a supervisor/research scientist, do you participate in planning the researches your department wishes to do and do you think they serve the needs of society? Are your opinions considered?

Q6- Do the incentives available in your department are upto your expectations?

Q7- Has it ever happened that a particular research was stopped while you were the supervisor or a member of the research team?

Q8- In your opinion, do researches carried out in Bahrain have credibility?

Q9- What are your personal aspirations as a supervisor/research scientist?

Q10- In your opinion, what suggestions should be followed for the growth and development of research in Bahrain and what are the means for developing the creative innovative research?

Q11- Are there any other questions that should have been asked; any further suggestions or queries?

Appendix (3)

Questionnaire's Covering Letter

Bahrain Centre for
Studies & Research

Questionnaire's Number

Date: 25 April, 1995.

Dear Researcher,

My name is Naima Al-Dossery and I am the head of the scientific research support section in the scientific research department in Bahrain Centre for Studies and Research. At present, I am a Ph.D. student at the University of Leicester in the United Kingdom. I am undertaking a research project entitled "Management of Researchers in the Governmental Organisations in Bahrain.

I would like to seek your co-operation in answering the questions in the attached questionnaire. The questions deal with nature of work, supervision, promotion, work conditions, peer group, organisation, compensation, general job satisfaction, innovatory climate, reputation and culture.

I sincerely hope that you will answer the questions contained in this questionnaire with complete freedom and frankness, assuring you that all the information obtained will be treated in complete confidentiality and used for the sole purpose of this research project only.

Thank you for your co-operation

Naima Al-Dossery
Bahrain Centre for Studies & Research

Note : A self addressed envelope with paid stamp is attached to return back the questionnaire.

Appendix (4)

Research Questionnaire

A- PERSONAL DETAILS

- Sex: 1- M [ ] 2- F [ ]

- Marital Status: 1- Single [ ] 2- Married [ ]

- Age: 1- 25-29 [ ] 2- 30-35 [ ]
  3- 36-40 [ ] 4- 41-45 [ ]
  5- 46-50 [ ] 6- 51 & above [ ]

- Number of Children: ----------

- Qualifications: 1- B.Sc./BA or equivalent Year -------
  2- M.Sc./MA Year -------
  3- Ph.D. Year -------

- Length of Service:
  1- 1-5 years [ ] 2- 6-10 years [ ]
  3- 11-15 years [ ] 4- 6-20 years [ ]
  5- 21-25 years [ ] 6- 26-30 years [ ]

- Number of all Previous Employers: ----------

- The Nature of Your Research: 1- Sciences [ ] 2- Social Sciences [ ]

- Title of Present Job ----------

1- NATURE OF WORK:

1- When you finish a days work do you feel you have achieved something really worthwhile?

1	2	3	4	5
very rarely	rarely	about half of the time	most of the time	all of the time

2- How much of your work generates real enthusiasm for you?

1	2	3	4	5
nearly all	most of it	about half	almost none	none at all

3- How much variety is there in your job? i.e. to what extent does the job require you to do many different things at work, using a variety of your skills and talents?

1	2	3	4	5
none at all	almost none	small amount	good deal	great deal

4- In general, how significant is the work you do? i.e. are the results of your work likely to significantly affect the lives or well-being of other people?

1	2	3	4	5
highly significant	significant	fairly significant	not significant	not very significant

5- To what extent does your job require you to use a number of complex or high level skills:

1	2	3	4	5
very great extent	great extent	some extent	small extent	very small extent

6- Does the job allow you the chance to use your personal initiative and judgement in carrying out your work?

1	2	3	4	5
very rarely	rarely	sometimes	most of the time	all of the time

7- Do you regard 'feedback' about your work as important to your personal motivation?

1	2	3	4	5
very unimportant	important	fairly important	important	very important

8- Are you personally satisfied with the feedback you receive about your work?

1	2	3	4	5
very satisfied	satisfied	fairly satisfied	dissatisfied	very dissatisfied

9- How would you describe your 'workload'

1	2	3	4	5
very seldom too heavy	seldom too heavy	sometimes too heavy	too heavy	always too heavy

10- How does the amount of work you are expected to do influence your overall attitude toward your job?

1	2	3	4	5
very unfavourable influence	unfavourable influence	neither	favourable influence	very favourable influence

11- How much autonomy do you have to make 'work related decisions'?

1	2	3	4	5
very great deal	great deal	small amount	almost none	none at all

12- Compared to 2 years ago, do you feel your autonomy is:

1	2	3	4	5
very greatly decreasing	greatly decreasing	about the same	greatly increasing	very greatly increasing

13- How would you describe your actual autonomy in comparison to your desired autonomy?

1	2	3	4	5
far too little	too little	about right	too much	far too much

14- To what extent does your job require you to work closely with other people in your organisation?

1	2	3	4	5
very large extent	large extent	some extent	small extent	very small extent

15- What percentage of your time do you spend on research work?

1	2	3	4	5
90% or more	80%	70%	60%	50% or less

16- How often do you discuss your research work with:

16a- someone outside the department 1 2 3 4 5

16b- some one from dept. that use your work 1 2 3 4 5

16c- your immediate superior

1	2	3	4	5
very often	often	some-times	rarely	very rarely

17- How many areas of specialisation do you consider yourself to have?

1 2 3 4 5 circle number

18- Do you have the opportunity to give seminars on your current work?

1	2	3	4	5
very often	often	sometimes	rarely	very rarely

19- Have you published any papers in a recognised scientific journal in the last five years?

1- YES [ ] 1a- Number Published ------- 2- NO [ ]

C- SUPERVISION

1- How do you feel about the quality of supervision you receive?

1	2	3	4	5
very dissatisfied	dissatisfied	fairly satisfied	satisfied	very satisfied

2- How well does your supervisor handle the administrative part of his/her job?

1	2	3	4	5
very well	well	adequately	not well	not at all well

3- How well does your supervisor know the technical side of the his/her job?

1	2	3	4	5
very well	well	adequately	not well	not at all well

4- How highly do you rate the 'scientific expertise' of your supervisor?

1	2	3	4	5
not very highly	not highly	about average	highly	very highly

5- If necessary, is your supervisor prepared to help you with personal problems?

1	2	3	4	5
as much as required	large extent	to some extent	to a small extent	not at all

6- Does your supervisor treat you as an 'important individual'?

1	2	3	4	5
not at all	to a small extent	to some extent	to a great extent	to a very great extent

7- Are you encouraged to participate in making important decisions?

1	2	3	4	5
all of the time	most of the time	sometimes	rarely	very rarely

8- In general, are you encouraged to speak up if you disagree with a decision made by your superior?

1	2	3	4	5
not at all	to a small extent	to some extent	to a great extent	to a very great extent

9- Does your supervisor ask your opinion before making a decision?

1	2	3	4	5
all of the time	most of the time	sometimes	rarely	very rarely

10- Is your supervisor friendly and easy to approach?

1	2	3	4	5
very friendly	friendly	neither	unfriendly	very unfriendly

11- Are you encouraged by your supervisor to work as a member of a team?

1	2	3	4	5
not at all	to a small extent	to some extent	to a great extent	to a very great extent

12- Does your supervisor encourage those who work for him/her to exchange opinions and ideas?

1	2	3	4	5
not at all	to a small extent	to some extent	to a great extent	to a very great extent

13- How often does your supervisor hold group meetings where everyone can discuss their work together?

1	2	3	4	5
very regularly	regularly	sometimes	infrequently	very infrequently

14- Do you have to wait for detailed reviews and approval from your supervisor before you take action?

1	2	3	4	5
always	almost always	sometimes	almost never	never

15- Does your supervisor provide you with the help needed to plan your work in advance?

1	2	3	4	5
always	almost always	sometimes	almost never	never

16- Does your supervisor offer new ideas for solving work related problems?

1	2	3	4	5
never	almost never	sometimes	often	very often

17- Does your immediate superior employ 'general' or 'close' styles of supervision?

1	2	3	4	5
very general	general	neither	close	very close

D. PROMOTION

1- How do you feel about your future employment prospects in the research department?

1	2	3	4	5
very concerned	concerned	neither	optimistic	very optimistic

2- How do your feelings about your employment prospects influence your overall attitude to work?

1	2	3	4	5
very favourably	favourably	no influence	unfavourably	very unfavourably

3- Do you feel you are getting on in the department?

1	2	3	4	5
making no progress at all	making no progress	some progress	great deal of progress	very great deal of progress

4- Do you have the opportunity to attend training programmes designed to update and broaden your skills?

1	2	3	4	5
very frequently	frequently	sometimes	almost never	never

5- Do you think you have adequate training in terms of your career prospects and your effectiveness in the department?

1	2	3	4	5
totally inadequate	inadequate	adequate	more than adequate	totally adequate

6- How would you describe the opportunity for advancement in the department?

1	2	3	4	5
very few opportunities	few opportunities	some opportunities	many opportunities	a lot of opportunities

7- How would you rate the status of your job in comparison with other professions requiring similar qualifications?

1	2	3	4	5
very high	high	about average	low	very low

8- Is it possible for you to gain promotion without the need to take on managerial responsibility?

1- YES [ ] 2- NO [ ]

9- Is it departmental policy to encourage you to:

1- take out patents [ ] 2- attend conferences [ ]
3- present papers [ ]

E- WORK CONDITIONS

1- Are you satisfied with your physical working conditions?

1	2	3	4	5
very satisfied	satisfied	neither	dissatisfied	very dissatisfied

2- How do your physical working conditions affect the way you do your work?

1	2	3	4	5
very unfavourable influence	unfavourable influence	neither	favourable influence	very favourable influence

3- How clear is your understanding of the goals/objectives of the department?

1	2	3	4	5
very clear	clear	neither clear/unclear	unclear	very unclear

4- would you say that you identify with the goals/objectives of the department?

1	2	3	4	5
very closely	closely	to some extent	to a small extent	not at all

5- How would you describe the pressure to produce results?

1	2	3	4	5
very high pressure	high pressure	some pressure	little pressure	very little pressure

6- How secure do you feel your job in the research department is?

1	2	3	4	5
very secure	secure	neither	insecure	very insecure

7- In your opinion, is the department atmosphere conducive to the expression of individual ideas, opinions, and suggestions?

1	2	3	4	5
very unfavourable atmosphere	unfavourable atmosphere	neither	favourable atmosphere	very favourable atmosphere

8- Is it usual for information about changes in departmental policies, procedures, and strategies to be communicated to you?

1	2	3	4	5
very great deal of downward communication	great deal of downward communication	some downward communication	little downward communication	very little downward communication

9- Who or what is your main source of information about what is happening in:

9a- the department: ----------

9b- the organisation: ----------

10- In your experience, are relations with other departments friendly and co-operative?

1	2	3	4	5
very friendly interdept. relations	friendly inter-dept. relations	neither friendly/ unfriendly	unfriendly inter-dept. relations	very unfriendly interdept. relations

11- Are the goals of research in conflict with organisation goals?

1	2	3	4	5
always in conflict	usually in conflict	sometimes in conflict	almost never in conflict	never in conflict

12- Are organisational policies consistently and fairly applied within the department?

1	2	3	4	5
very inconsistent and unfair	inconsistent and unfair	about average	consistent and fair	very consistent and fair

13- Does the department offer you good opportunities to fulfil personal career objectives?

1	2	3	4	5
lot of opportunities	many opportunities	some opportunities	few opportunities	very few opportunities

14- Do you think the research department has a good image in the organisation in general?

1	2	3	4	5
very good image	good image	about average	bad image	very bad image

15- Within research, are individuals rewarded for 'performance', rather than, for example, length of service?

1	2	3	4	5
performance very rarely rewarded	performance rarely rewarded	performance sometimes rewarded	performance regularly rewarded	performance very regularly rewarded

16- Within the department, do you feel there is the opportunity for individual development?

1	2	3	4	5
lot of opportunities	many opportunities	some opportunities	few opportunities	very few opportunities

17- Within the department, is it possible to develop <u>your own</u> desired goals?

1	2	3	4	5
very few chances	few chances	some chances	many chances	lot of chances

18- Are you provided with adequate resources (human, financial, and hardware) to do your job well?

1	2	3	4	5
very good resources	good resources	adequate resources	inadequate resources	very inadequate resources

19- How would you describe the morale of the department?

1	2	3	4	5
very low	low	about average	high	very high

20- How would you rate the productivity of the department?

1	2	3	4	5
very low	low	average	high	very high

21- Do you think the department is a better or worse place to work than it was say, 2 years ago?

1	2	3	4	5
much better	better	about the same	worse	much worse

F- PEER GROUP

1- How is your overall attitude toward your job influenced by the people you work with?

1	2	3	4	5
very unfavourably	unfavourably	neither	favourably	very favourably

2- In the department is there?

1	2	3	4	5
no friction	almost no friction	some friction	great deal of friction	very great deal of friction

3- How would you rate the scientific expertise of your co-scientists?

1	2	3	4	5
very low	low	average	high	very high

4- In general, how friendly and easy to approach are the persons in your immediate work group?

1	2	3	4	5
very friendly	friendly	neither	unfriendly	very unfriendly

5- Do the people in your work-group encourage each other to work as a team?

1	2	3	4	5
very little teamwork	little teamwork	some teamwork	great deal of teamwork	very great deal of teamwork

6- Do people in your work-group offer each other new ideas for solving work-related problems?

1	2	3	4	5
very often	often	sometimes	rarely	very rarely

7- Do the people in your work-group exchange opinions and ideas about their research?

1	2	3	4	5
very often	often	sometimes	rarely	very rarely

G- ORGANISATION

1- In your opinion, is employee welfare important in the organisation?

1	2	3	4	5
not very important	not important	about average	important	very important

2- How highly do you think your organisation's scientific expertise is rated by competitors in similar organisations?

1	2	3	4	5
very highly	highly	average	poor	very poor

3- How highly do you think your organisation is rated in terms of 'academic' credibility?

1	2	3	4	5
very highly	highly	average	poor	very poor

4- How closely do you identify with the nature of the research work in the organisation?

1	2	3	4	5
not at all	to a small extent	to some extent	to a large extent	to a very large extent

5- To what extent is the research department integrated with the remainder of the organisation?

1	2	3	4	5
very tightly integrated	tightly integrated	loosely integrated	not integrated	not integrated at all

6- By choice, would you prefer to be doing research work of some other kind?

1	2	3	4	5
rather do other work		do not mind		prefer to do present work

7- In research, are you treated as a 'stockholder' in the organisation? (i.e., someone who has a long-term interest in the organisation)

1	2	3	4	5
to a very large extent	to a large extent	to some extent	to a small extent	not at all

8- To what extent is 'organisation prestige' (i.e., well-known to family and friends) important to you?

1	2	3	4	5
to a very large extent	to a large extent	to some extent	to a small extent	not at all

9- State the main reason for joining your present employer?

10- Are you satisfied with your choice of employer?

1	2	3	4	5
very satisfied	satisfied	neither	dissatisfied	very dissatisfied

11- If not satisfied, please state the main cause of your dissatisfaction?

12- Are you actively seeking a job in another organisation?

1- YES[ ] 2- NO [ ]

13- If yes, please state the main influence on; your choice of a new job?

H. COMPENSATION

1- Taking into account your personal circumstances and living costs in this area, how do you regard your salary?

1	2	3	4	5
very inadequate	inadequate	adequate	more than adequate	very adequate

2- Does the way salary scales are organised encourage your commitment to the department?

1	2	3	4	5
highly encourages commitment	encourages commitment	neither	discourages commitment	highly discourages commitment

3- Taking into account your education, training and experience, how do you regard you salary?

1	2	3	4	5
very unsatisfactory	unsatisfactory	adequate	satisfactory	very satisfactory

4- In comparison with jobs requiring similar responsibilities, skills, and commitment, do you feel your salary is:

1	2	3	4	5
very unsatisfactory	unsatisfactory	adequate	satisfactory	very satisfactory

5- How does your salary influence your overall attitude to work?

1	2	3	4	5
very favourable influence	favourable influence	neither	unfavourable influence	very unfavourable influence

6- How are salary increases determined within the department?

1- staff negotiating committee? [ ]
2- individual negotiation? [ ]
3- by management alone? [ ]

7- Does the department operate a system of regular appraisal?
1- YES[ ] 2- NO [ ]

8- If so, does the appraisal have an impact on your level of ;remuneration?
1- YES[ ] 2- NO [ ]

9- Is there any scheme for the payment of bonus/profit share?
1- YES[ ] 2- NO [ ]

I- GENERAL JOB SATISFACTION

1- How satisfied are you with your job?

1	2	3	4	5
very dissatisfied	dissatisfied	neither	satisfied	very satisfied

2- If you had to decide again, would you still join your present department?

1	2	3	4	5
definitely same dept.	same dept.	perhaps	not same dept.	definitely not same dept.

3- If a close friend wanted a job as a scientist in your department what would you recommend?

1	2	3	4	5
highly advise against	advise against	perhaps recommend	recommend	strongly recommend

4- Do you think that research as a profession provides good opportunities for career fulfilment?

1	2	3	4	5
great many opportunities	many opportunities	some opportunities	few opportunities	very few opportunities

J- INNOVATORY CLIMATE

1- Does the department encourage the development of new ideas?

1	2	3	4	5
to a large extent	to a good extent	to some extent	to a small extent	not at all

2- Could the department be described as flexible and adaptable?

1	2	3	4	5
not at all	to a small extent	to some extent	to a large extent	to a very large extent

3- Within the department, are you encouraged to challenge your basic assumptions about science?

1	2	3	4	5
definitely encouraged	encouraged	neither	discouraged	definitely discouraged

4- Are you encouraged to search for fresh, new ways of looking at problems?

1	2	3	4	5
not at all	to a small extent	to some extent	to a large extent	to a very large extent

5- Do you feel that you are able to perform your work functions in a creative way?

1	2	3	4	5
not at all	to a small extent	to some extent	to a large extent	to a very large extent

6- Do you feel that any assistance you may require in developing new ideas is readily available?

1	2	3	4	5
always available	available	sometimes available	rarely available	very rarely available

7- In your opinion, can new ideas come from anywhere in the department and still be well received?

1	2	3	4	5
definitely not	not	neither	yes	definitely yes

8- Are you encouraged to be independent?

1	2	3	4	5
definitely encouraged	encouraged	neither	discouraged	definitely discouraged

9- Is your work evaluated by results rather than by the way in which they are accomplished?

1	2	3	4	5
definitely yes	yes	neither	no	definitely no

K- REPUTATION

1- How would you describe the department's reputation, i.e. is it a good or a bad place to work?

1	2	3	4	5	6	7
very bad	bad	below average	average	good	very good	excellent

2- How do you think most other people in the department regard its reputation?

1	2	3	4	5	6	7
very bad	bad	below average	average	good	very good	excellent

L- CULTURE

1- POWER DISTANCE:

a) How frequently, in your experience, does the following problem occur: 'employees being afraid to express disagreement with their managers?'

1	2	3	4	5
very frequently	frequently	average	seldom	very seldom

b) What is your boss's usual decision-making style?

1	2	3	4	5
autocratic	paternalistic style	on the contrary	based on majority vote	none of these

c) What is your preference for your boss's decision-making style?

1	2	3	4	5
autocratic	paternalistic style	on the contrary	based on majority vote	none of these

2- INDIVIDUALISM VERSUS COLLECTIVISM

1- Does your job leaves sufficient time for your personal and family life?

1	2	3	4	5
very important	important	about average	not important	very unimportant

2- How important is the freedom to adopt your own approach to the job?

1	2	3	4	5
very important	important	about average	not important	very unimportant

3- How important is it to have work from which you can achieve a personal sense of accomplishment?

1	2	3	4	5
very important	important	about average	not important	very unimportant

4- How important is it to have training opportunities to improve existing skills or learn new skills?

1	2	3	4	5
very important	important	about average	not important	very unimportant

5- How important is it to have good physical working conditions (good ventilation and lighting, adequate work space, etc.)?

1	2	3	4	5
very important	important	about average	not important	very unimportant

6- How important it to fully use your skills and abilities on the job?

1	2	3	4	5
very important	important	about average	not important	very unimportant

3- ACHIEVEMENT

1- How important is the opportunity for high earnings

1	2	3	4	5
very important	important	about average	not important	very unimportant

2- How important is it to get the recognition you deserve when you do a good job?

1	2	3	4	5
very important	important	about average	not important	very unimportant

3- How important is it to have an opportunity for advancement to higher level jobs?

1	2	3	4	5
very important	important	about average	not important	very unimportant

4- How important is it to have challenging work from which you get a personal sense of accomplishment?

1	2	3	4	5
very important	important	about average	not important	very unimportant

5- How important is it to have a good working relationship with your direct superior?

1	2	3	4	5
very important	important	about average	not important	very unimportant

6- How important is it to work with people who co-operate well with one another?

1	2	3	4	5
very important	important	about average	not important	very unimportant

7- How important is it to live in an area desirable to you and your family?

1	2	3	4	5
very important	important	about average	not important	very unimportant

8- How important is it to have the security that you will be able to work or your company as long as you want to

1	2	3	4	5
very important	important	about average	not important	very unimportant

4- UNCERTAINTY AVOIDANCE

1- How often do you feel nervous or tense at work?

1	2	3	4	5
very often	often	sometimes	rarely	very rarely

2- Organisation rules should not be broken-even when the employee think it is in the organisation's best interest'

1	2	3	4	5
Strongly Agree	Agree	neither	Disagree	Strongly Disagree

3- How long do you think you will continue working for your department?

1	2	3	4
Two years at the most	2-5 years	More than 5 years	Until I retire

THANK YOU VERY MUCH FOR COMPLETING THE QUESTIONNAIRE.

APPENDIX (5)

Summary: Jones's (1992a) Hofstede's (1980) Studies and Analysis of Bahrain Culture

5.1 Introduction

The findings of the present study on the determinants of internal departmental reputation among research scientists in research organisations in Bahrain are being compared with those of Jones (1992a) on the determinants of departmental reputation among R&D scientists in ten high technology organisations in Britain. Therefore, for reference and completeness Jones's study is summarised here.

It is argued in chapter one that the comparison of the UK and Bahrain results would not be complete without taking into consideration the cultural differences between the two countries. For this reason the work of Hofstede (1980) on culture and organisations which gives the results of research carried out on IBM employees in 50 countries and 3 regions, including Britain and a group of Arab-speaking countries, will be covered in this appendix. I included the same questions on culture used by Hofstede in my questionnaire and the responses of the research scientists were analysed to ascertain the position of Bahrain in relation to the four dimentions of national culture developed by Hofstede. The result together with the comparison between Britain and Bahrain's culture is given in section 5.4.

5.2 Determinants of Internal Reputation

Jones considered the term reputation useful to an understanding of the relationship between employees and their employers. He examined the concept of human resources reputation as perceived by scientists in high-technology organisations i.e. it examined their perceptions of their organisations (internal reputation).

The main objectives of the study were to establish whether reputation is a construct in its own right, i e distinct from other organisational variables such as job satisfaction or climate, and to identify the main determinants of departmental reputation in the perception of R&D scientists. On the basis of a wide survey of the literature Jones established the importance of reputation for the well-being of the organisation and its competitiveness in the market and also the link between internal and external reputation. In examining the relationship between the main determinants and reputation, Jones broadly followed the models of Abratt (1989) and Kennedy (1977) which stipulated that image or reputation was formed by a process involving managerial behaviour, employees' perceptions and attitudes, and the relationship with external groups. Jones considered other important factors that directly relate to the employee/employer relationship. A number of sources were consulted to develop these additional constructs, notably "The Experience of Work" by Cook, Hepworth, Wall, and Warr (1981), and also the work of Siegel and Kaemmerer (1978) who developed a questionnaire designed to operationalise the dimensions of climate in innovative organisations. Their results formed the basis of the Siegel Scale of Support for Innovation (SSSI).

Through examining the above literature related to employee/employer relationships, Jones identified nine independent variables (plus personal characteristics) which were relevant to this search for the determinants of departmental reputation, these being:

- nature of work (WORK)
- managerial style (MGT)
- promotional opportunities (PROM)
- organisational satisfaction (SATIS)
- compensation/remuneration (PAY)
- working conditions (WCON))
- team work relationships (TEAMWK)
- innovatory climate (INNO)
- job satisfaction (JSAT)
- personal characteristics (Five altogether: Age, length of service, sex, number of employers and Educational level.

Jones in his original work stated the following hypotheses:

H1 The nature of work would be the main factor in establishing a good departmental reputation.

H2 Managerial style would be the second most important factor in establishing a good departmental reputation.

H3 A reputation for being a good place to work would be of major importance to an R&D department in terms of the recruitment and retention of high-quality personnel.

H4 Reputation would be identifiably different in different groups in the department:

a) those with a Ph.D. and/or membership of a professional body would rate reputation lower than non-professionals.

b) older employees would rate reputation higher than their younger colleagues.

c) male - female would differ in their reputation ratings (direction of difference not specified).

H5 Falling product demand or a more competitive environment would change managerial commitment to reputation.

Personal characteristics were included because it was anticipated that reputation would vary according to these dimensions. For example, ratings for reputation were expected to rise along with age and tenure, and to decrease with an increase in the number of previous employers. Jones suggests that the nine independent variables mentioned above would together with personal characteristics determine the scientists' perception of departmental reputation.

The research data were collected from R&D employees by means of an extensive questionnaire dealing with the factors likely to influence their perceptions of their employer. Five pharmaceutical companies, middle-ranking in terms of their size and commitment to R&D, were selected, plus five organisations equally committed to R&D, three in the nuclear industry and two chemical companies. The total number of responses from the ten companies was 402, a rate of 71.1%. The sample, in terms of age, sex, qualifications and experience, was considered to be representative of the scientists in the organisations surveyed. Every respondent was educated to at least BSc level and 36% had obtained PhDs. The questionnaires, after agreement with the personnel manager, were distributed to a cross section of the department's employees who returned the completed document to the author in a pre-paid envelope in complete confidentiality.

The results were analysed in order to establish whether reputation was a construct in its own right, what the main determinants of reputation were and what implication could be drawn for the management of R&D employees.

Principal components analysis was used to ensure that reputation existed independently of other concepts. And a multiple regression equation was constructed to examine the relationship between the dependent variable, reputation, and the independent variables (Nine variables + Five personal variables). It was found that 44.5% of the variance of reputation was accounted for by the sixteen variables. Stepwise selection was then used to identify those variables which made the greatest contribution to the explanation of the dependent variable (reputation). It was found that innovatory climate was the main explanator of reputation and accounted for 35% of the variance. Working conditions were the second variable selected and accounted for 14% of the variance. In a later work, using revised independent variables identified by factor analysis, Jones (1996) found that, while innovatory climate was the main determinant of reputation, job satisfaction was the second main determinant. According to this model, therefore, internal reputation is determined primarily by innovatory climate and job satisfaction. Other variables - sex, number of previous employers, qualifications and trade union membership - did not affect reputation significantly. The hypothesised relationship between age/tenure and reputation was not confirmed. Tenure was negatively related to reputation. Age was also negatively associated with reputation.

In summary, this research used a combination of principal components analysis and multiple regression to establish the existence of reputation and identify its main determinants. The analysis confirmed that human resources reputation exists as a distinct concept and that it is primarily determined by climate and job satisfaction.

The main determinants of reputation in the two models i.e. Jones (1992a) and Jones (1996) were:

Jones (1992a) Reputation : INNO (35%); WCON (14%); AGEDIS (3%); TEAMWK (2.6%); PROM (0.6%)

Jones (1996), Reputation: CLMAT (29.7%); JOSAT (6.6%); TENDIS (3.3%); WKCON (1.9%); COMPY (0.7%)

Jones concluded that reputation had been used in the literature on organisational behaviour to describe a variety of organisational attributes; in his work he concentrated on defining and operationalising the concept of human resources reputation. He used data obtained from 402 R&D scientists employed in ten technology-based organisations to confirm the hypotheses that innovatory climate and job satisfaction were the major determinants of reputation. The research confirmed the importance of climate and satisfaction to organisational professionals employed in R&D departments. Other variables such as working conditions and pay made little contribution to the explanation of reputation. Tenure, the third most important variable was negatively associated with the dependent variable (reputation). Older, longer serving employees had a more negative view of their organisation than their younger colleagues.

Links with contingency theory, which established links between organic organisational structures and effective R&D activity, have also been claimed. Therefore there is a need to ensure that professional R&D employees have the opportunity to engage in work that is intrinsically interesting and that the delayering of organisations emphasises the need for job enrichment as opportunities for vertical movement up the hierarchy becomes increasingly meagre.

Jones points out some limitations of the research not least the fact that it relied on correlational data and statistical tests of significance in the data analysis. He points out that cross-sectional correlation data are problematic since it was difficult to identify the direction of causality: while the research indicates that innovatory climate and job satisfaction determine departmental reputation, it is possible that reputation influences employee perceptions of climate and satisfaction. Another limitation is the extent to which the study is based on aggregated data when there is a considerable debate in the literature about the legitimacy of aggregating individual perceptions to represent organisational or departmental attributes.

The research suggests a number of areas for future research with particular emphasis on examining the implications of reputation for individual and organisational performance.

5.3 Cultures and Organisations

The cultural aspect had to be addressed in order to make the comparison between the findings of my research and that of Jones's complete. It is important because it is

believed that national culture, and organisational culture in particular, can affect people's behaviour and performance and are essential parts of any social study in this regard.

Table 5.1 Abbreviations for the Countries & Regions Studied

Abbreviation	*Country or region*	*Abbreviation*	*Country or region*
ARA	Arab-speaking countries (Egypt, Iraq, Kuwait, Lebanon, Libya, Saudi Arabia, United Arab Emirates)	ISR	Israel
		ITA	Italy
		JAM	Jamaica
		JPN	Japan
		KOR	South Korea
ARG	Argentina	MAL	Malaysia
AUL	Australia	MEX	Mexico
AUT	Austria	NET	Netherlands
BEL	Belgium	NOR	Norway
BRA	Brazil	NZL	New Zealand
CAN	Canada	PAK	Pakistan
CHL	Chile	PAN	Panama
COL	Colombia	PER	Peru
COS	Costa Rica	PHI	Philippines
DEN	Denmark	POR	Portugal
EAF	East Africa (Ethiopia, Kenya, Tanzania, Zambia)	SAF	South Africa
		SAL	Salvador
		SIN	Singapore
EQA	Equador	SPA	Spain
FIN	Finland	SWE	Sweden
FRA	France	SWI	Switzerland
GBR	Great Britain	TAI	Taiwan
GER	Germany F.R.	THA	Thailand
GRE	Greece	TUR	Turkey
GUA	Guatemala	URU	Uruguay
HOK	Hong Kong	USA	United States
IDO	Indonesia	VEN	Venezuela
IND	India	WAF	West Africa (Ghana, Nigeria, Sierra Leone)
IRA	Iran		
IRE	Ireland (Republic of)	YUG	Yugoslavia

A questionnaire was distributed among the IBM employees in the same kind of positions on the survey questions in 50 countries and 3 regions (table 5.1 (Hofstede, 1991, p55). The questions cover the four basic problem areas which were defined by Inkeles and Levinson (1954). These basic problem areas correspond to dimensions (a dimension being an aspect of a culture that can be measured relative to other cultures)

which Hofstede called power distance, collectivism versus individualism, femininity versus masculinity, and uncertainty avoidance. Together they form a four-dimensional (4-D) model of differences among national cultures.

Each country in this model is given a score for each of the four dimensions, calculated from the answers to the questionnaire. A mean score was worked out for the answers of a similar sample of people from each country or the percentage was computed of people choosing particular answers. A statistical procedure (factor analysis) was used to sort the survey questions into groups, called factors or clusters, for which the mean scores or percentages appeared to vary together.

The following are the four dimensions used in the Hofstede questionnaire, together with the findings for each dimension.

1- **Power Distance** : is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.

Power Distance scores tell one about the degree of dependence in a society. In small power distance countries there is limited dependence of subordinates on bosses and a preference for consultation, that is, interdependence between boss and subordinate. The emotional distance between them is relatively small: subordinates will quite readily approach and contradict their bosses. In large power distance countries there is considerable dependence of subordinates on bosses. Subordinates respond by either

preferring such dependence (in the form of an autocratic or paternalistic boss), or rejecting it entirely, which in psychology is known as counter-dependence; that is dependence, but with a negative sign. Large power distance countries thus show a pattern of polarisation between dependence and counter-dependence. The emotional distance between subordinates and their bosses is large: subordinates are unlikely to approach and contradict their bosses directly. Higher power distance values are scored by Latin countries, both 'Latin European', like France and Spain, and Latin American, and by Asian and African countries; lower values are scored by the USA, Great Britain and its former Dominions, and by the non-Latin part of Europe (to the extent that it is covered; Eastern European countries are missing from the data, except Yugoslavia, which scores high on PDI). Sweden scores 31 and France 68.

2- **Individualism Versus Collectivism**: Individualism obtains in societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. Collectivism as its opposite characterises societies in which people onwards are integrated into strong, cohesive in-groups, which throughout people's lifetimes protect them in exchange for unquestioning loyalty.

Nearly all wealthy countries score high on IDV while nearly all poor countries score low. There is a strong relationship between a country's national wealth and the degree of individualism in its culture. Sweden scores 71 and the group of Arab-speaking countries to which Saudi Arabia belongs scores an average of 38. Many countries which score high on PDI score low on IDV and vice versa. In other words,

the two dimensions tend to be negatively correlated: large power distance countries are likely to be more collectivist, and small power distance countries to be more individualist.

3- **Masculinity Versus Femininity**: Masculinity characterises societies in which social gender roles are clearly distinct (i e men are supposed to be assertive, tough, and focused on material success whereas women are supposed to be modest, tender, and concerned with the quality of life); femininity is found in societies in which social gender roles overlap (i e both men and women are supposed to be modest, tender, and concerned with quality of life).

The study found high masculinity in Japan (rank 1), in some continental European countries: Austria (2), Italy (4/5), Switzerland (4/5), and West Germany (9/10), and in certain Latin American countries, mainly the larger countries around the Caribbean: Venezuela (3), Mexico (6), Colombia (11/12), Ecuador (13/14) and also, at some distance, Argentina (20/21). Other scores were Ireland (7/8), Jamaica (7/8), Great Britain (9/10), South Africa (13/14), USA (15), Australia (16), New Zealand (17), Canada (24); and finally the Philippines (11/12), Greece (18/19), Hong Kong (18/19), India (20/21), Belgium (22), and the Arab-speaking countries (23).

4- **Uncertainty Avoidance**: is defined as the extent to which the members of a culture feel threatened by uncertain or unknown situations. This feeling is, among other things, reflected in nervous stress and a desire for predictability: a need for written and unwritten rules. The study showed high scores for Latin American, 'Latin

European', and Mediterranean countries (from 112 for Greece to 67 for Ecuador). Japan and South Korea also scored high (92 and 85). Medium high were the scores of the German-speaking countries Austria, Germany (Federal Republic) and Switzerland (70, 65, and 58 respectively). Medium to low were the scores of the other Asian countries (from 69 for Taiwan to 8 for Singapore), of the African countries, and of the Anglo-Saxon and Nordic countries plus the Netherlands (from 59 for Finland to 23 for Denmark). West Germany scored 65 (ranked 29) and Great Britain 35 (47/48). Thus there is a culture gap between these otherwise similar countries with regard to the avoidance of uncertainty.

5.4 Culture Comparison Between Bahrain & Britain

Culture here means the collective programming of the mind which distinguishes the members of one group or category of people from another (Hofstede, p5). Culture is learned, not inherited. It derives from one's social environment, not from one's genes. The programming starts within the family; it continues within the neighbourhood, at school, in youth groups, at the place of work and in the community.

One of the objectives of the present study was to compare the results with that of Jones (1992a), taking the cultural dimensions into account. However, Jones unfortunately did not include questions on culture in his questionnaire and therefore direct comparison is not possible. Nevertheless, it is hoped that the IBM study on differences in national value systems will provide some basis for the comparison,

since Britain and a group of Arab countries (Lebanon, Egypt, Kuwait, Saudi Arabia and United Arab Emirates) were included.

Assuming that Bahrain's social characteristics will not deviate very much from those of the group of Arab speaking countries included in the IBM study, especially Kuwait, Saudi Arabia, and the United Arab countries (which are in the same region), the results of the study can be used to help explain the variations in the responses between Bahrain and Britain.

In the next section I examine the differences between Britain and the group of Arab-speaking countries with regard to the four cultural dimensions mentioned above i e power distance, individualism, masculinity, and uncertainty avoidance.

5.4.1 Power Distance

Power distance scores (PD1) from the IBM study are shown in table 5.2 (Hofstede, 1991, p26).

Table 5.2 Power Distance Index (PDI) Values for 50 Countries & 3 Regions

Score rank	*Country or region*	*PDI score*	*Score rank*	*Country or region*	*PDI score*
1	Malaysia	104	27/28	South Korea	60
2/3	Guatemala	95	29/30	Iran	58
2/3	Panama	95	29/30	Taiwan	58
4	Philippines	94	31	Spain	57
5/6	Mexico	81	32	Pakistan	55
5/6	Venezuela	81	33	Japan	54
7	Arab countries	80	34	Italy	50
8/9	Equador	78	35/36	Argentina	49
8/9	Indonesia	78	35/36	South Africa	49
10/11	India	77	37	Jamaica	45
10/11	West Africa	77	38	USA	40
12	Yugoslavia	76	39	Canada	39
13	Singapore	74	40	Netherlands	38
14	Brazil	69	41	Australia	36
15/16	France	68	42/44	Costa Rica	35
15/16	Hong Kong	68	42/44	Germany FR	35
17	Colombia	67	42/44	Great Britain	35
18/19	Salvador	66	45	Switzerland	34
18/19	Turkey	66	46	Finland	33
20	Belgium	65	47/48	Norway	31
21/23	East Africa	64	47/48	Sweden	31
21/23	Peru	64	49	Ireland (Republic of)	28
21/23	Thailand	64	50	New Zealand	22
24/25	Chile	63	51	Denmark	18
24/25	Portugal	63	52	Israel	13
26	Uruguay	61	53	Austria	11
27/28	Greece	60			

Table 5.2 shows high power distance values for the Asian and African countries, which include the group of Arab-speaking countries (ARA), and lower values for countries like USA and Britain (GBR). The score for ARA is a large power distance index (80), compared with only 35 for GBR. The key differences between small and large power distance societies at the work place, as summarised by Hofstede (1991, p37), are shown in table 5.3.

Table 5.3 Key Differences Between Small and Large PD Societies

Small Power Distance	Large Power Distance
- Hierarchy in organisations means an inequality of roles, established for convenience.	Hierarchy in Organisations reflects the existential inequality between higher-ups and lower-downs.
- Decentralisation is popular	Centralisation is popular.
- Narrow salary range between top and bottom of organisation.	Wide salary range between top and bottom of organisation.
- Subordinates expect to be consulted.	Subordinates expect to be told what to do.
- The ideal boss is a resourceful democrat.	The ideal boss is a benevolent autocrat or good father.
- Privileges and status symbols are frowned upon.	Privileges and status symbols for managers are both expected and popular.

5.4.1.1 Bahraini response to Power Distance

The same questions relating to the power distance dimension of national culture as were used by Hofstede in the IBM research were addressed to scientists in Bahrain research organisations.

To the first question on how frequently employees were afraid to express disagreement with their managers 40% of the Bahraini scientists answered 'very frequently' or 'frequently', which was the highest for the given scale (average 28%; 'seldom' 24%; 'very seldom' 6%). In response to the second question on the boss's

decision - making style the answers 'none of these' or 'on the contrary' were given by 34% and 33% respectively, while the other styles scored: 'autocratic' 12% 'paternalistic' 10% and 'based on majority rate' 7%. The preferences for the boss's decision-making style scored 'on the contrary' 63%, 'based on majority rate' 15%, 'none of these' 10%, 'paternalistic' 6% and 'autocratic' 0.6%.

Based on Hofstede's conclusion that in large power distance countries there is a considerable dependence of subordinates on bosses and sub ordinates respond by either preferring such dependence (in the form of an autocratic or paternalistic boss), or rejecting it entirely (the case here) i.e. counter dependence (dependence with negative sign), the above responses by research scientists in Bahrain seem to suggest that Bahrain could be considered a large power distance country by employees are unlikely to approach and contradict their managers directly. As mentioned in section 1, the Arab-speaking countries (ARA) are amongst the large power distance countries, as shown by the IBM results; the ARA group in fact scored 80 for the power distance index (PDI). This further confirms Bahrain's position as a large power distance country. However, Bahrain is geographically located in the same region as parts of Saudi Arabia (eastern province), Kuwait, and the United Arab Emirates and shares the same language, religion and customs.

Great Britain (GBR), however, scored only 35 for (PDI) in the IBM studies, qualifying as a small power distance country, in which employees quite readily approach and contradict their managers.

5.4.2 Individualism and Collectivism

The second dimension of national culture used in the IBM studies was individualism versus collectivism. All the 50 countries involved in the study were given individualism index scores (IDV) which were low for collectivist and high for individualist societies. The study showed that the level of individualism or collectivism was strongly associated with the degree of importance attached to certain 'work goals'. These were, for the individualist pole: personal time (work goal 1), freedom (work goal 2), and challenge (work goal 3); and for the opposite, collectivist pole: training (work goal 4), physical conditions (work goal 5) and use of skills (work goal 6). If the IBM employees in a country rated 'personal time' relatively important, they generally also rated 'freedom' and 'challenge' as important, but 'training', 'physical conditions' and 'use of skills' as unimportant. Such a country was considered individualist. If, on the other hand, the first three were scored as relatively unimportant and the last three as relatively important, then such a country was considered collectivist.

The IBM study shows that nearly all wealthy countries score high on IDV while nearly all poor countries score low.

Hofstede argues that personal time, freedom and challenging work are identifiable with individualism and stress the employees' independence from the organisation. On the other hand training, physical conditions and skills used on the job refer to things the organisation does for the employee and thus stress the employee's dependence on the organisation. This fits in with collectivism and ties with what was

said earlier about individualist countries tending to be rich and collectivist countries poor. What in rich countries are taken for granted and seen as relatively unimportant work goals such as training, physical conditions, and the use of skills in poor countries are essential for distinguishing a good job from a bad one and are therefore quite important work goals.

Table 5.4 Individualism Index (IDV) Values for 50 countries and 3 Regions

Score rank	*Country or region*	*IDV score*	*Score rank*	*Country or region*	*IDV score*
1	USA	91	28	Turkey	37
2	Australia	90	29	Uruguay	36
3	Great Britain	89	30	Greece	35
4/5	Canada	80	31	Philippines	32
4/5	Netherlands	80	32	Mexico	30
6	New Zealand	79	33/35	East Africa	27
7	Italy	76	33/35	Yugoslavia	27
8	Belgium	75	33/35	Portugal	27
9	Denmark	74	36	Malaysia	26
10/11	Sweden	71	37	Hong Kong	25
10/11	France	71	38	Chile	23
12	Ireland (Republic of)	70	39/41	West Africa	20
			39/41	Singapore	20
13	Norway	69	39/41	Thailand	20
14	Switzerland	68	42	Salvador	19
15	Germany F.R.	67	43	South Korea	18
16	South Africa	65	44	Taiwan	17
17	Finland	63	45	Peru	16
18	Austria	55	46	Costa Rica	15
19	Israel	54	47/48	Pakistan	14
20	Spain	51	47/48	Indonesia	14
21	India	48	49	Colombia	13
22/23	Japan	46	50	Venezuela	12
22/23	Argentina	46	51	Panama	11
24	Iran	41	52	Equador	8
25	Jamaica	39	53	Guatemala	6
26/27	Brazil	38			
26/27	Arab countries	38			

The IBM study showed that the two cultural dimensions; power distance and collectivism tend to be negatively correlated i.e. large power distance countries are also likely to be more collectivist and small PD countries to be more individualist. Table 5.4 (Hofstede, p53) shows IDV score value of 38 for the ARA group and 89 for

GBR, and a PDI value of 80 for the ARA group and 35 for GBR. The key differences between collectivist and individualist societies in the work place are summarised in table 5.5 (Hofstede, 1991, p67).

Table 5.5 Key Differences Between Collectivist and Individualist Societies

Collectivist	Individualist
- Diplomas provide entry to higher status groups.	Diplomas increase economic worth and/or self-respect.
- Relationship employer-employee is perceived in moral terms, like a family link.	Relationship employer-employee is a contract supposed to be based on mutual advantage.
- Hiring and promotion decisions take employee's in-group into account.	Hiring and promotion decisions are supposed to be based on skills and rules only.
- Management is management of groups.	Management is management of individuals.
- Relationship prevails over task.	Task prevails over relationship.

5.4.2.1 Bahrain Response to Individualism

The research scientists response in Bahrain to the six questions measuring the second dimension of national culture was as follows: 'personal time' was rated very important by 90 out of 163 employees; 'freedom to adopt one's own approach to the

job' was rated very important by 83 employees; 'challenging work to do' was rated very important by 104 employees; 'having training opportunities' was rated very important by 127 employees; 'having good physical conditions at work' was rated very important by 132 employees; and 'fully using one's skills and abilities on the job' was rated very important by 127 employees.

It is suggested by Hofstede from the IBM employees' response that a country in which work goals (1), (2) and (3) are scored as important and (4), (5) and (6) as unimportant, was to be considered individualist; and that one in which work goals (4), (5) and (6) were scored as important and (1), (2), and (3) as unimportant was to be considered collectivist. However, the above paragraph shows that the responses on work goals (1), (2), (3), (4), (5) and (6) were all scored as very important or important. However work goals (4), (5) and (6) were chosen by 127, 132, 127 employees respectively compared with 90, 83, and 104 employees who chose work goals (1), (2), and (3). This tips the scale in favour of its being considered a collectivist country.

The individualism index (IDV) in the IBM studies for GBR was 80, indicating an individualist country, and that for the ARA group 38, indicating a less individualist and more collectivist one. This seems to tie in, even if only loosely, with the Bahrain results.

5.4.3 Masculinity versus Femininity (Achievement)

Through the analysis of the answers to a set of 14 questions on work goals, the IBM study identified two underlying dimensions: one was individualism versus

collectivism, discussed in the previous section, and the other was masculinity versus femininity. The masculine pole was associated with; earnings (work goal 1), recognition (work goal 2), advancement (work goal 3), and challenge (work goal 4). The feminine pole was associated with; manager (work goal 5), co-operation (work goal 6), living area (work goal 7), and employment security (work goal 8).

The men attached importance, in particular, to work goals 1 and 3 while the women put a good working relationship with their direct superior and co-operation first. Hofstede explains that the importance of earnings and advancement corresponds to the masculine, assertive, and competitive social role, while the importance of relations with the manager and with colleagues corresponds to the feminine, caring and social environment-oriented role.

Table 5.6 Masculinity Index (MAS) Values for 50 Countries & 3 Regions

Score rank	*Country or region*	*MAS score*	*Score rank*	*Country or region*	*MAS score*
1	Japan	95	28	Singapore	48
2	Austria	79	29	Israel	47
3	Venezuela	73	30/31	Indonesia	46
4/5	Italy	70	30/31	West Africa	46
4/5	Switzerland	70	32/33	Turkey	45
6	Mexico	69	32/33	Taiwan	45
7/8	Ireland (Republic of)	68	34	Panama	44
			35/36	Iran	43
7/8	Jamaica	68	35/36	France	43
9/10	Great Britain	66	37/38	Spain	42
9/10	Germany FR	66	37/38	Peru	42
11/12	Philippines	64	39	East Africa	41
11/12	Colombia	64	40	Salvador	40
13/14	South Africa	63	41	South Korea	39
13/14	Equador	63	42	Uruguay	38
15	USA	62	43	Guatemala	37
16	Australia	61	44	Thailand	34
17	New Zealand	58	45	Portugal	31
18/19	Greece	57	46	Chile	28
18/19	Hong Kong	57	47	Finland	26
20/21	Argentina	56	48/49	Yugoslavia	21
20/21	India	56	48/49	Costa Rica	21
22	Belgium	54	50	Denmark	16
23	Arab countries	53	51	Netherlands	14
24	Canada	52	52	Norway	8
25/26	Malaysia	50	53	Sweden	5
25/26	Pakistan	50			
27	Brazil	49			

For each country in the IBM study, a masculinity index (MAS) score was calculated. Scores ranged from zero for the most feminine to 100 for the most masculine country. Table 5.6 (Hofstede, 1991, p84) shows the MAS scores. The scores, like those for individualism and power distance, represent relative, not absolute positions of countries. The results show that unlike individualism, masculinity is unrelated to a country's degree of economic development: there are both rich and poor masculine and rich and poor feminine countries. The MAS index score for GBR is 66 and that for the ARA group is 53; both GBR and ARA are on the masculine side. Hofstede reports that the IBM study showed that female managers, in comparison with a matching group of male managers, had more masculine values than the men (the same was not true for female versus male professionals, however). Ambitious women are more frequently found in masculine than feminine societies in the IBM studies.

Table 5.7 Key Differences Between Feminine & Masculine Societies

Feminine	Masculine
- Work in order to live.	Live in order to work.
- Managers use intuition and strive for consensus.	Managers expected to be decisive and assertive.
- Stress on equality, solidarity and quality of work life.	Stress on equity, competition among colleagues, and performance.
- Resolution of conflicts by compromise and negotiation.	Resolution of conflicts by fighting them out.

The key issues on which masculine and feminine societies differ in the work place are summarised in table 5.7 (Hofstede, 1991, p96).

5.4.3.1 Bahrain Response to Masculinity

The response of the research scientists to questions designed to show whether a country (society) is masculine i e assertive, tough and focused on material success or feminine i.e. more modest, tender and concerned with the quality of life was as follows: 'having opportunity for high earnings' (work goal 1) was scored as 'very important' by 87, 'recognition' (work goal 2) was scored by 109, 'advancement' (work goal 3) by 100, 'challenge' (work goal 4) by 118, 'manager' (work goal 5) by 123, 'co-operation' (work goal 6) by 137 'living area' (work goal 7) by 112 and 'employment security' (work goal 8) by 128.

As can be seen, the 'very important' score for work goals 5,6,7, and 8 (the feminine pole) was higher than for goals 1,2,3, and 4 (the masculine pole). Hofstede's analysis suggested that men attached greater importance, in particular, to work goals (1), and (3) and women to (5) and (6) i e the earnings and advancement were associated with a masculine, assertive and competitive social role, while relations with manager and colleagues were associated with the feminine caring, and social environment-oriented role. The above results suggest that Bahrain is closer to the feminine pole than the masculine according to the IBM studies, bearing in mind that the comparison is not based on the same index as the IBM research. However, the number of employees who responded to questions was thought to be a reasonable indicator of which type of society Bahrain belong to.

The ARA group in the IBM study scored a masculinity index (MAS) of 53 compared with 66 for Britain and 95 for Japan.

5.4.4 Uncertainty Avoidance

The fourth dimension in the IBM research is uncertainty avoidance. Each country in the project was assigned an uncertainty avoidance index (UAI) which goes from strong to weak. The feeling of uncertainty, like the previous three characteristics is acquired and learned (Hofstede, p111).

Table 5.8 Uncertainty Avoidance Index (UAI): Values for Countries Studied

Score rank	*Country or region*	*UAI score*	*Score rank*	*Country or region*	*UAI score*
1	Greece	112	28	Equador	67
2	Portugal	104	29	Germany FR	65
3	Guatemala	101	30	Thailand	64
4	Uruguay	100	31/32	Iran	59
5/6	Belgium	94	31/32	Finland	59
5/6	Salvador	94	33	Switzerland	58
7	Japan	92	34	West Africa	54
8	Yugoslavia	88	35	Netherlands	53
9	Peru	87	36	East Africa	52
10/15	France	86	37	Australia	51
10/15	Chile	86	38	Norway	50
10/15	Spain	86	39/40	South Africa	49
10/15	Costa Rica	86	39/40	New Zealand	49
10/15	Panama	86	41/42	Indonesia	48
10/15	Argentina	86	41/42	Canada	48
16/17	Turkey	85	43	USA	46
16/17	South Korea	85	44	Philippines	44
18	Mexico	82	45	India	40
19	Israel	81	46	Malaysia	36
20	Colombia	80	47/48	Great Britain	35
21/22	Venezuela	76	47/48	Ireland (Republic of)	35
21/22	Brazil	76	49/50	Hong Kong	29
23	Italy	75	49/50	Sweden	29
24/25	Pakistan	70	51	Denmark	23
24/25	Austria	70	52	Jamaica	13
26	Taiwan	69	53	Singapore	8
27	Arab countries	68			

In the study three questions produced strong correlations amongst country mean scores. These questions related to job stress, breaking company rules even if in the company's best interest and the intention of staying with the company. Hofstese explains that in order for the combination of the three questions to make sense, the analysis needed to look at the differences in mean answers by country. The mean answers were correlated across the 50 countries and 3 regions. If more people in a country feel under stress at work, more people in that country want rules to be respected, and more want to have a long-term career.

Table 5.9 Key Differences Between Weak & Strong Uncertainty Avoidance Societies

Weak Uncertainty Avoidance	Strong Uncertainty Avoidance
- There should not be more rules than is strictly necessary.	Emotional need for rules, even if these will never work.
- Time is a framework for orientation.	Time is money.
- Comfortable feeling when lazy; hard-working only when needed.	Emotional need to be busy; inner urge to work hard.
- Precision and punctuality have to be learned.	Precision and punctuality come naturally.
Tolerance of deviant and innovative ideas and behaviour.	Suppression of deviant ideas and behaviour; resistance to innovation.
Motivation by achievement and esteem or belongingness.	Motivation by security and esteem or belongingness.

Table 5.8 (Hofstede, 1991, p113) shows the uncertainty avoidance index (UAI) values for the 50 countries and regions. A UAI value of 0 indicates the weakest uncertainty

avoidance and over 100 the strongest. The Arab-speaking group (ARA) scored 68 compared with 35 for Britain (GBR), i e GBR is a society with less anxiety than the ARA. Table 5.9 (Hofstede, 1991, p125) shows the key differences between weak and strong uncertainty avoidance countries.

5.4.4.1 Bahrain Response to Uncertainty Avoidance

The response of the Bahraini research scientists on the fourth dimension of national culture, 'the extent to which the members of a culture feel threatened by uncertain or unknown situations, a feeling which is, among other things, expressed through nervous stress and in a need for written and unwritten rules', was as follows: to the first question on how often they felt nervous or tense at work 40 answered 'often' and 93 'sometimes' to the second question on breaking of the organisation's rules even if in the interest of organisation 60 (a majority) answered 'agree'; and to the third and final question on how long they would continue to work for the department 64 (again a majority) answered 'until I retire'.

Hofstede in his analysis in the IBM study concluded that if in a country more people felt under stress at work, more people in that country would want rules to be respected and to have a long - term career. The results suggest that this is the case in Bahrain, i e there is a strong tendency towards uncertainty avoidance. The uncertainty avoidance index (UAI) value scored by the ARA group was 68 compared with 35 for GBR, so there was quite a marked difference in their ratings.

5.5 Summary

The analysis of the responses of the research scientists in Bahrain (of whom there were 163) has shown that Bahrain's position with regard to the four dimensions is as follows:

Bahrain can be regarded as a large power distance country, the main feature of which is a big emotional distance between subordinates and their bosses; subordinates are unlikely to approach and contradict their bosses directly, in contrary to Britain which is a small power distance country. Bahrain can be regarded as a collectivist country while Britain is clearly an individualist country.

As far the masculinity and femininity dimension is concerned, Bahrain can be regarded as a less masculine country than Britain. The IBM studies categorised Japan as the highest masculine country, scoring 95, while Britain scored 66. One of the main features of a masculine society is that managers are expected to be decisive and assertive.

Bahrain shows a strong tendency towards the uncertainty avoidance position in contrast to Britain, which was categorised by the IBM study as a weak uncertainty avoidance country. A key difference between a strong and a weak UA country is that in the former there is an emotional need for rules, even if these will never work, while in weak UA countries the feeling is that there should not be more rules than are strictly necessary.

Appendix (6)

The Questionnaire (Jones, 1992a)/Reliability and Validity

To ensure the questionnaire's reliability and validity it was important to ensure that each item had a sound theoretical basis. Ideally, each variable should have been based on items used in previous research with proven figure for reliability. This was not possible in every case, although, well established scales were used whenever possible. Using items extensively employed in other research ensured that the variables did actually 'operationalise' the intended theoretical concept. 'Construct validity is particularly important where the construct is operationalised by a scale which has no simple or single referent against which the measure can be evaluated' (Cook, Hepworth, Wall, and Warr, 1981, p7).

Nature of Work (21 Items)

Two sources were used in the construction of the 'nature of work', Smith's (1962 and 1976) 'Index of Organisational Reactions' and Hackman and Oldham's (1975) 'Job Characteristics'. The Index of Organisational Reactions (IOR) is a 42-item scale which taps eight specific satisfactions; supervision, company identification, kind of work, amount of work, co-workers, physical work conditions, financial rewards, and career future. The IOR was used extensively throughout the construction of the present questionnaire as it covered many similar topics. Four items were selected from the IOR for the 'nature of work', two of six relating to the 'Kind of Work', and two of four relating to the 'Amount of Work'. The IOR has been used for many studies and large samples have substantiated the scales. For example, Dunham, Smith

and Blackburn (1977) obtained validity and reliability data for each of the sub-scales. Using the Kruder-Richardson test, they reported internal reliability estimates of 0.89 for the 'Kind of Work' and 0.77 for the 'Amount of Work' (Cook et al, 1981, p39). Dunham (1977) obtained alpha reliability coefficients, on a sample of 3600, of 0.71 and 0.72 respectively. A number of other studies have used some items from the IOR, for example, Hamner and Smith (1978); Pierce, Dunham and Blackburn (1979).

Hackman and Oldham's (1976 & 1980) 'Job Characteristics' construct has its theoretical base in the authors' Job Characteristic Model. This identifies 'five core job characteristics (that) influence employees' attitudes and behaviours' (Cook et al, 1981, p177). The five characteristics are; skill variety, task identity, task significance, autonomy, and feedback from job. Reported internal validity for the characteristics have 'tended to vary' (Cook et al, 1981). However, Dunham (1977) on a sample of 784 white-collar workers and managers reported alphas of 0.76, 0.72, 0.72, 0.73 and 0.75 respectively. Alphas reported by Oldham, Hackman and Stepina (1978) were consistently lower; 0.71, 0.59, 0.66, 0.66, and 0.71. There is some suggestion that results have varied according to the organisational 'level' at which the instrument was administered.

Eight items were selected in the following manner; two of three from 'autonomy'; two of three from 'dealing with others'; one of three from 'task significance'; two of three from 'skill variety'; and one of three from 'feedback from agents'. It was believed that using eight items rather than 15 would not have a detrimental effect on the information obtained. Dunham (1977) confirmed by factor analysis that

combining the items into one scale was theoretically sound. Factor analysis with oblique rotation obtained one large factor which accounted for over 83% of the variance. Pierce and Dunham (1978), also identified one major factor in their study of 155 insurance employees.

To acquire more specific information, an additional five items were developed using Hackman and Oldham's (1976 & 1980) work as a model. Two items dealt with 'autonomy', one with 'feedback', and two sought greater detail about contact with others (outside the department). The work of Pelz and Andrews (1976) was also important in the development of the additional items. In particular, the idea that scientists are more effective if some time is spent on 'administration and teaching' and that 'external contacts' are important in stimulating productivity.

Management (17 Items)

The variable 'management' was based on items extracted from two instruments, the Michigan Organisational Assessment Questionnaire (MOAR) (Cammann, Fichman, Jenkins & Klesh, 1979; Seashore, Lawler, Mirvis & Cammann, 1982); and Supervisory and Peer Leadership (SPL) (Taylor & Bowers, 1972).

The MOAR contains a number of scales designed to measure work attitudes and perceptions. The section dealing with supervision comprised 30 items intended to tap ten aspects of leadership. Three of those aspects were considered relevant to the theoretical underpinnings of the present research. Alpha coefficients of internal reliability, obtained from a sample of 400 employees, were; control of work, 0.87;

consideration, 0.89; and participation 0.76 (Cook et al, 1981, p245). Factor Analysis, which tended to load onto one large general factor, provided evidence that subscales could be combined. 'Intercorrelations presented in the source publications make it clear that there is considerable overlap between sub-scales' (Cook et al, 1981, p246). For example, 'consideration' and 'participation' had a correlation of 0.69, other subscales correlated between 0.70 and 0.75.

The subscales were not used as complete constructs. There appeared to be too much repetition and greater brevity was required for an instrument dealing with a broad range of topics. Consequently, the following items were extracted; three of five (control of work), two of three (consideration), and three of three (participation).

Taylor and Bowers' (1972) instrument, Supervisory and Peer Leadership, covered four aspects of leadership; support, goal emphasis, work facilitation, and interaction facilitation. The latter two, which constrained four and three times respectively were extracted en bloc. Alpha coefficients, from a sample of 325, reported by the authors were 0.94, 0.85, 0.88, and 0.89 respectively. The scales were also found to be highly intercorrelated, varying from a low of 0.72 to a high of 0.81. Therefore, it was judged to be acceptable, theoretically, to use the individual items as part of one single variable.

Promotion (9 Items)

'Promotion' consisted of 9 items, seven of which were ordinal. The IOR construct 'Career Future' which contained 5 items was used in its entirely, although, wording

was modified slightly to make it more appropriate to the specific sample. The IOR has been extensively used in a variety of organisations and at a variety of levels. Dunham (1977), with a sample of 3610, reported an alpha of 0.78 for 'Career Future'. While Dunham, Smith and Blackburn (1977) reported a Kruder-Richardson internal reliability estimate of 0.83 on a sample of ;more than 12000.

Two additional items, linking the importance of training and promotional opportunities, were extracted from the section of the Michigan Organisational Assessment Questionnaire dealing with 'Task, Job and Role Characteristics'. The subscale 'training adequacy' which originally had three items was the model, for which Seashore, Lawler, Mirvis, and Cammann (1982) reported an alpha coefficient of 0.59.

Work Conditions (21 Items)

'Work Conditions' consists of twenty ordinal items with one 'open' question dealing with departmental and organisational sources of information. Although the IOR had a similarly named construct, 'Physical Work Conditions' which comprised six items only two were used. The remaining 4 were judged too similar to those extracted and therefore, unlikely to add meaning to 'Work Conditions'. The similarity of the original variables may explain the very high Kruder-Richardson internal reliability of 0.9 reported by Dunham et al (1977).

The remaining items were extracted from the work of Jones and James (1979) in which they attempted to establish the dimensions and relationships of 'Psychological

Climate'. The psychological climate questionnaire consisted of 145 items which represented 35 a priori constructs, 'many of which had been shown by previous research to be internally consistent, psychologically meaningful measures of the work environment' (Jones & James, 1979, p211). The items selected for inclusion belonged to the category 'Subsystem and Organisational Characteristics'. These items were developed from the authors' research on; organisational ambiguity and conflict, consistency of organisational policies and reward processes, and professional and organisational identification.

In the original research, 52 individual variables formed 12 items. The variables for this research were formulated from the composite items described in 'Subsystem and Organisational Characteristics', Jones and James (1979). The reported reliability was rather low, coefficient alphas varied from 0.44 to 0.67. Nevertheless, Jones and James (1979, p218) considered them acceptable 'because alpha is a function of the number of items in the composite and tends to be conservative'.

Peer Group (7 Items)

Three items were extracted from the IOR, and four from Taylor and Bowers' (1972) Supervisory and Peer Leadership. The three IOR items were taken from the construct 'Co-workers' which comprised 5 items in total. The two items eliminated did not contribute to the present conceptualisation of peer group. Dunham, Smith and Blackburn (1977) with their massive sample of 12971 estimated a Kruder-Richardson internal reliability of 0.77 for 'Co-workers'.

The Taylor and Bowers' (1972) instrument was formed from two discrete components; 'Supervisory Leadership' and 'Peer Leadership'. The latter comprised 11 items divided under four headings; Support, Goal Emphasis, Work Facilitation, and Interaction Facilitation'. Once again, not all the items were believed to fully contribute to the present conceptualisation 'Peer Group'. The items were extracted in the following manner; one of three form 'Support', two of three from 'Interaction Facilitation', and one of three from 'Work Facilitation'.

Taylor and Bowers (1972) obtained alpha internal reliabilities of 0.87, 0.70, 0.89, and 0.90 for the four components of 'Peer Leadership' from a sample of 325. Cluster analysis carried out by the authors 'generally supported the *a priori* classification' (Cook et al, 1981: 248). However, the four scales of 'Peer Leadership' were highly intercorrelated, varying from 0.56 to 0.71. It was therefore, deemed valid to extract and combine a number of the original variables.

Organisation (13 Items)

This variable was developed to investigate two aspects of the relationship between scientists and their employer, first, attitudes on the wider aspects of organisational identification. Secondly, the relationship between employment in scientific R&D and the overall 'goals' of the organisation. It proved difficult to identify an instrument that had used 'Organisation' in the same conceptual form. Although, the IOR construct, 'Company Identification', with five items, served as a basic model for 'Organisation'. Every attempt was made to ensure the items retained their original meaning although wording was changed to increase clarity. Dunham (1977) obtained an alpha

coefficient of 0.79 on his sample of 784 employees from various levels in the organisation.

Work dealing with 'bureaucratic structures' and the organisation of R&D was used to develop the remaining items. Burns and Stalker (1961) drew a distinction between mechanistic and organismic systems of management. A mechanistic system was supposedly more effective in a stable environment, whereas, an organismic system was appropriate for greater uncertainty. Technological innovation is an 'uncertain' activity, therefore, R&D departments should be organised on more 'organismic' lines. That is, less importance attached to the formal hierarchy, but greater emphasis on the commitment and 'professionalism' of the individual scientist. Consequently, large organisations have tended to segregate R&D from other functions (Hull, 1988).

Compensation (8 Items)

'Compensation' comprised eight items of which five were ordinal. These five were developed entirely from the IOR construct 'Financial Rewards'. It was necessary to restructure and reward the five IOR items while retaining the general format and objectives. Dunham, Smith and Blackburn (1977) reported a Kruder-Richardson internal reliability of 0.85 on their original sample of 12971. Dunham (1977) obtained an alpha coefficient of 0.77 for 'Financial Rewards'.

General Job Satisfaction (4 Items)

A number of researchers have dealt with the topic of overall or general job satisfaction; Bullock (1952); Taylor and Bowers (1972); and Hackman and Oldham

(1975). However, Quinn and Staines' (1979) Facet-free Job Satisfaction was judged to be the most appropriate. The authors used five items to tap 'a workers general affective reaction to the job without any reference to a specific job facet' (Quinn and Staines, 1979, p205). The questions had been used in two earlier studies, 1969 and 1973 (Quinn and Shepard, 1974).

The items were designed to be easy to administer and applicable to employees at all levels in the organisation. Quinn and Shepard (1974) reported an alpha coefficient of 0.77 on a sample of 1515 respondents. Beehr (1976) reported a Spearman-Brown coefficient of 0.80 on a shorter form of the scale (also see Beehr, Walsh and Taber, 1976).

Innovatory Climate (9 Items)

All items for 'Innovatory Climate' were extracted from the Siegel Scale of Support for Innovation. The SSSI was an attempt to operationalise the dimensions of organisational climate within an innovative organisation. Siegel and Kaemmerer (1978, p554) defined an 'Innovative Climate' as one that 'fosters the creative functioning of its members'. The authors identified and developed five dimensions of an innovative climate; leadership, ownership, norms for diversity, continuous development, and consistency.

Factor Analysis, 'Principle factors technique', followed by varimax rotation identified three factors; support for creativity (23 items), tolerance of difference (31 items), and personal commitment (7 items). The Spearman-Brown split-halves reliabilities were

0.94, 0.94, and 0.86 respectively. The complete SSSI contained 61 discrete items and it was beyond the scope of the present research to obtain such detailed information. Nine items were selected to represent 'Innovatory Climate'; seven from 'support for creativity' and two from 'tolerance of difference', these were identified as most relevant to the research objectives.

Appendix (7)

Example to Illustrate ANOVA

To illustrate the technique of ANOVA a simple example (Freund, 1974) will be considered. Suppose that a pin bowler wants to know whether the weight of the ball he uses will affect his game. He plans to roll six games each with the ball he has been using, a lighter ball, and a heavier ball. Not having the time to finish however, he only gets the following results:

Lighter Ball	Ball he has been Using	Heavier Ball
182	190	161
165	179	178
196	208	165
157	186	
164	178	
180	211	

The means of these three samples are, respectively, 174, 192, and 168. This suggests that he should keep playing with the same ball. However, since the samples are small, the differences among the means may not be significant. In order to make a decision

the null hypothesis needs to be tested. The work is normally exhibited in an analysis-of-variance table:

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Treatments	k-1	SS (Tr)	MS (Tr) = SS (Tr)/k-1	MS (Tr)/MSE
Error	k(n-1)	SSE	MSE = SSE/k(n-1)	
Total	kn-1	SST		

Where, SST = total sum of squares (measure of total variation)

SS (Tr) = treatment sum of squares (measure of variation among sample means)

SSE = error sum of squares (measure the variation within the sample)

n = sample size

k = number of samples

For the above example, the analysis-of-variance table will be as shown below (modified formulas for calculating the various sums of squares have been used to cater for the fact that the sample sizes are not equal; also in this case the total number of degrees of freedom is N-1, where N= n1 + n2 + ... + nk; and degrees of freedom for treatments and error are: k-1 and N-k respectively):

Sources of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Treatments	2	1512	756	4.06
Error	12	2234	186.2	
Total	14	3746		

Now, to test the null hypothesis we compare SS (Tr) with SSE by means of an appropriate F statistic.

The F value as can be seen from the table above is 4.06 which exceeds 3.89, the value of F 0.05 for 2 and 12 degrees of freedom (this value can be read from pre-prepared tables, now however, as mentioned earlier all this including the sum of squares is done by the computer through statistical packages). Therefore, the null hypothesis will have to be rejected and we conclude that the weight of the ball does have an effect on the bowler's game.

Appendix (8)

Total Effect Calculations

Consider Path Diagram (Figure 7.2)

Variable	Indirect Effect	Direct Effect	Total Effect (Indirect+Direct)
INNO	___	0.277 (from equation)	0.277
JSAT	___	0.210 (" ")	0.210
ACADM	(via JSAT) 0.193X0.210=0.0405	0.205 (" ")	0.2455
WCON	(via INNO) 0.336X0.277=0.0930 (via JSAT) 0.363X0.210=0.0762 Total=0.1692	___	0.1692
WORK	(via INNO) 0.154X0.277=0.0426 (via ACADM) 0.232X0.205=0.0475 Total=0.0901	___	0.090
MGT	(via INNO) 0.339X0.277=0.0939	___	0.0939
PROM	(via MGT) 0.212X0.339X0.277=0.01990	___	0.0199
PEER	(via WCON & INNO) 0.159X0.336X0.277=0.0147 (via ACADM) 0.222X0.205=0.0455 (via WCON & JSAT) 0.159X0.363X0.210=0.0121 Total=0.0723	___	0.0723
SATIS	(via WORK) 0.181X0.154X0.277=0.0077	___	0.0077

APPENDIX (9)

DESCRIPTIVE STATISTICS:

ALL VARIABLES

INN01R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.093	3.000	3.000	.947	.138	.143	161

INNO2

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.148	3.000	3.000	.893	.583	.244	162

INN03R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.000	3.000	3.000	.893	.041	.223	154

INN04

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.724	3.000	3.000	1.013	.498	.177	156

INNO5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.375	3.000	4.000	.937	.120	.398	160

INNO6R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.825	3.000	3.000	.836	.526	.118	160

INN07

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.572	4.000	4.000	.903	1.541	1.288	159

INN08R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.132	3.000	4.000	1.080	.763	.297	159

INNO9R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.648	5.000	5.000	.529	.240	1.129	122

JSAT1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.155	3.000	4.000	1.099	.877	.342	161

JSAT2R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.138	3.000	3.000	1.139	.598	.197	159

JSAT3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.290	3.000	3.000	1.060	.145	.356	145

JSAT4R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.629	4.000	3.000	.899	.532	.032	151

WCON1R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.344	4.000	4.000	1.124	.592	.685	149

WCON2R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.117	3.000	4.000	1.117	.928	.261	162

WCON3R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.110	4.000	5.000	1.042	1.501	1.382	94

WCON4R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.943	4.000	4.000	.821	.686	.728	159

WCON5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.576	3.000	3.000	.869	.157	.117	158

WCON6R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.473	3.000	3.000	.917	.346	.132	150

WCON7

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.296	4.000	4.000	1.059	.663	.552	159

WCON8R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.929	3.000	3.000	1.023	.414	.375	154

WCON10R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.938	4.000	4.000	.798	2.219	1.164	160

WCON11

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.070	4.000	4.000	.626	.233	.226	142

WCON12

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.357	3.000	3.000	.862	.758	.398	157

WCON13R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.333	2.000	3.000	1.094	.740	.312	153

WCON14R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.486	3.000	3.000	.922	.117	.118	148

WCON15

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.329	2.000	3.000	1.023	.576	.262	149

WCON16R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.108	3.000	3.000	1.138	.629	.161	158

WCON17

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.917	3.000	3.000	.916	.003	.064	156

WCON18R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.936	3.000	3.000	1.090	.658	.173	157

WCON19

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.006	3.000	3.000	1.013	.432	.277	156

WCON20

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.283	3.000	3.000	.880	.445	.531	159

WCON21

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.172	3.000	3.000	.761	1.473	.141	157

WORK1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.883	4.000	4.000	.871	1.206	.907	127

WORK2

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.693	4.000	4.000	.819	1.051	.675	142

WORK3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.901	4.000	4.000	.724	2.312	.842	162

WORK4

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.375	3.000	3.000	.888	.364	.215	160

WORK5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.828	4.000	4.000	.767	1.553	.779	138

WORK6

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.679	4.000	4.000	1.001	.167	.560	162

WORK7

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.092	4.000	4.000	.837	.053	.622	104

WORK8

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.684	4.000	4.000	.958	.376	.382	155

WORK9

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.174	3.000	3.000	.997	.243	.165	161

WORK10

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.512	4.000	4.000	.947	.103	.702	162

WORK11

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.531	4.000	4.000	.872	.761	.580	162

WORK12

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.383	3.000	3.000	.820	.199	.007	162

WORK13

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.820	3.000	3.000	1.018	.768	.099	161

WORK14

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.745	4.000	4.000	.847	.740	.513	157

WORK16A

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.808	3.000	3.000	1.272	1.006	.019	120

WORK16B

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.602	4.000	4.000	1.152	.236	.613	128

WORK16C

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.951	4.000	5.000	1.181	.496	1.109	142

WORK17

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.466	2.000	2.000	.911	.034	.436	146

WORK18

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.503	3.000	3.000	1.096	.540	.211	159

MGT1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.209	3.000	3.000	1.136	.533	.317	143

MGT2

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.377	3.000	4.000	1.180	.727	.332	162

MGT3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.578	4.000	4.000	1.116	.326	.498	161

MGT4

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.481	4.000	4.000	.945	.239	.648	160

MGT5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.441	2.000	1.000	1.293	.981	.412	161

MGT6

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.513	4.000	4.000	1.058	.333	.824	160

MGT7

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.111	3.000	4.000	1.115	.635	.331	162

MGT8

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.566	3.000	3.000	1.156	1.006	.038	159

MGT9

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.342	3.000	3.000	1.135	.263	.496	161

MGT10

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.846	4.000	4.000	.994	.246	.645	162

MGT11

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.466	4.000	4.000	1.173	.710	.411	161

MGT12

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.329	3.000	3.000	1.122	.492	.330	161

MGT13

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.858	3.000	3.000	1.068	.556	.040	162

MGT14

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.770	3.000	3.000	.963	.158	.179	161

MGT15

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.117	3.000	3.000	.993	.253	.046	162

MGT16

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.069	3.000	3.000	.935	.379	.374	159

MGT17

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.373	4.000	4.000	1.080	.614	.483	158

PROM1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.867	3.000	3.000	1.008	.561	.192	150

PROM2

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.291	3.000	4.000	.953	.688	.212	158

PROM3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.269	3.000	3.000	.867	.326	.200	160

PROM4

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.210	3.000	3.000	.908	.392	.077	162

PROM5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.975	3.000	3.000	.922	.202	.096	161

PROM6

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.211	2.000	3.000	1.033	.585	.392	161

PROM7

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.252	3.000	3.000	.957	.163	.390	155

PEER1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.646	4.000	4.000	.728	.595	.422	161

PEER2R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.562	3.000	3.000	.884	.283	.056	162

PEER3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.609	3.000	3.000	.663	.064	.201	151

PEER4R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.044	4.000	4.000	.638	3.524	.920	160

PEER5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.128	3.000	3.000	.955	.057	.215	156

PEER6R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.386	3.000	3.000	.872	.949	.490	158

PEER7R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.399	3.000	3.000	.934	.251	.338	153

ORGN1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.315	5.000	5.000	.981	3.886	-1.948	162

ORGN2R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.604	4.000	4.000	.900	.409	.500	159

ORGN3R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.408	3.000	4.000	.923	-.080	-.340	152

ORGN4

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.393	3.000	3.000	.793	.899	-.036	140

ORGN5

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.639	3.000	3.000	.799	.310	.078	144

ORGN6

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.285	3.000	3.000	1.132	-.071	-.024	144

ORGN7R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.766	3.000	3.000	1.046	-.414	.028	141

ORGN8R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.591	4.000	4.000	1.040	.068	-.684	149

ORGN10R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.863	4.000	4.000	.991	1.146	-1.128	161

PAY1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.574	3.000	2.000	.970	-.833	.077	162

PAY2R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.936	3.000	3.000	.904	-.457	-.296	157

PAY3

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.512	2.000	2.000	1.005	-.916	.096	162

PAY4

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
2.537	3.000	3.000	.985	-.698	.093	162

PAY5R

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
3.043	3.000	3.000	.767	.781	-.325	162

REP1

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.839	5.000	5.000	1.400	.032	-.618	162

REP2

Mean	Median	Mode	Std dev	Kurtosis	Skewness	N
4.725	5.000	5.000	1.410	-.077	-.550	160

R= REVERSE SCORED

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