

THE IMPACT OF FACILITIES ON INFORMAL COMMUNICATION IN WORKPLACES

*The Role of the provision of Physical Design
Features in supporting Informal Communication
in Manufacturing Organisations - Saudi Arabia*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
الْحَمْدُ لِلَّهِ رَبِّ الْعَالَمِينَ
وَالصَّلَاةُ وَالسَّلَامُ عَلَى خَاتَمِ الْأَنْبِيَاءِ وَالْمُرْسَلِينَ

**In the Name of Allah,
the Compassionate, the Merciful,
Praise be to Allah, Lord of the Universe,
and Peace and Prayers be upon
His Final Prophet and Messenger.**

Dedicated to

my Mother, Father, to my Wife and Daughters

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ABSTRACT

Informal communication issues are much more significant to the success and effectiveness of an industrial organisation and worker's well-being than previously.

This study focuses on levels of informal communication in light industrial workplaces in the Middle East, and identifies the elements that affect it, one of which is the physical design features. In the concept of the total workplace, different elements contribute to enhance levels of informal communication such as the social and administrative setting, in addition to support services through elements of the physical environment including soft services, such as, vending machines.

The interest of this study deals with the provision of physical design features which are geared towards creating greater opportunities for informal communication in work places.

Therefore, this research hypothesised that the provision of desired physical design features would enhance the level of informal communication in the work place.

In this study, theories of organisation have been tabulated and related to theories of communication to investigate the role of the physical environment in workplaces. Moreover, an adaptation was made of Campbell & Campbell's (1988) model of informal communication and a replication of their study which they conducted in an educational setting was made in a light industrial settings in Saudi Arabia, this being the main focus of the study. In order to carry out the replication process a similar methodological process was implemented in this study by using a combination of methods and techniques including a field studies (direct observation), field experiment, and survey (interviews & questionnaires) techniques in testing the study sample.

The findings of the study indicate that the level of informal communication correlates positively with the provisions of physical design features which is in agreement with Campbell & Campbell's (1988) study findings in a Western educational setting.

Therefore, duplicate studies need to be conducted in office and light industrial workplaces in a Middle Eastern as well as Western and Far Eastern setting, so that a generalisation of findings can be accomplished.

Furthermore, the study findings suggest the need for further empirical research study in other aspects of the total work place concept, including the relationship of physical design features to the social setting and administrative setting. The quality of space in terms of its environmental, aesthetic values and the pattern of space design in which these physical elements are laid out should also be considered in relation to each other and the users of the space.

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List of Abbreviations

<i>vend</i>	: vending machine
<i>temp</i>	: temperature
<i>visual</i>	: visual contact between passers-by and lounge occupants
<i>cent-loc</i>	: central location within factory building
<i>micro</i>	: microwave
<i>cross-pw</i>	: cross pathway
<i>food</i>	: food service
<i>boiler</i>	: hot water boiler
<i>aural</i>	: (hearing) contact between passers-by and occupants
<i>phone</i>	: public telephone
<i>major traffic</i>	: on or near major traffic way
<i>near-prod-a</i>	: near production area
<i>near-admi-a</i>	: near administration area
<i>bul-board</i>	: bulletin board

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CHAPTER - 1

INTRODUCTION

1.1 Overview

This study attempts to investigate the impact of the provision of physical design features on the level of informal communication in light industrial setting.

Invariably, in an industrial settings there is provision for environmental support facilities such as rest areas, lounges, recreation areas, etc., which serve the production and administrative work force. These facilities are designed to provide a place of relaxation during the 'off-task period'. In particular, some lounges make use of creative physical designs elements such as comfortable furniture, refreshment services for food and beverages, reading materials, audio and visual elements, etc.. Some others even offer certain entertainment facilities like electronic or computer games. One idea behind the provision of these facilities is to promote informal communication amongst users of the lounges and therefore to create a better environment for employees during their off-task period.

Modern management all over the world believes that a better environment relates to productivity. This very distinct idea which has already provided positive results, improved job satisfaction, reduced absenteeism and at the same time lowered employees turnover.¹

Lounge space in light industrial buildings is the focal point of this study in terms of its physical features impact on the level of informal communication among users of the lounge.

1.2 Relevant works and study objectives

Except for the works of Campbell, D. & Campbell, T., (1988), no extensive study has been conducted addressing the role of the provision of physical environment on informal communication in industrial workplaces. Aside from providing an informal communication model in organisation, they also conducted two studies that examined the link between elements of the physical environment and informal communication in university departmental lounges. Both studies examined one link in the model of informal communication in organisations, that is the relationship between environmental supports and the degree of informal communication in an educational setting.

Campbell & Campbell (1988) examined the hypothesis that there is a relationship between the physical characteristics of lounge settings and the type of use.²

Another study was the research work submitted as a Ph.D. thesis by Ben Yaseen A.(1994) titled "The Physical Settings and Informal Interaction in Work places - The Role of Spatial Structure in Supporting Informal Communication in Organisations." BenYaseen endeavoured to study the relationship between the spatial structure of office layouts and the interaction patterns. The study formulated guidelines aimed at helping designers and managers to control and manage the problem of informal interaction in offices. While considering office trends worldwide, he established three different sets of variables assumed to have influenced the level of interaction in offices: physical environment variables; spatial environment variables; and organisational variables.

The concern of this research is to discuss the effects of the provision of physical design features on the level of informal communication in factory lounges. These

physical design features are hypothesised in this study as attractants; behavioural props; holding power; location; and, aesthetics features.

As per accessed information, no previous research has been done to study the effects of the provision of physical design features on the levels of informal communication in industrial workplace lounges. Given the social characteristics of the closely knit Saudi Arabian society, and Saudi Arabia's Sixth Development Plan (1995-2000), whose primary objective is to emphasise the private sector role and Saudiisation of work force, it became necessary to study the ways in which to upgrade the overall industrial workplace environment and make it attractive for young Saudi graduates of vocational training and technical college to work in.³

The study objectives coincide with the goals and objectives of Saudi Development Plans in industrial workplaces in particular. The study objectives are as follows:

- 1) *examining and finding the impact of the provision of physical design feature on levels of informal communication in non-working areas within light industrial workplaces in Saudi Arabia;*
- 2) *providing a design guideline specific to lounges in light industrial workplaces;*
- 3) *to replicate in an industrial setting and a different cultural background, Campbell & Campbell's (1988) study which was conducted in a Western educational setting in order to confirm validity of findings.*

The hypothesis of the research is as follows:

The provision of desirable physical design features would enhances the levels of informal communication among workers in factory lounges.

1.3 Significant innovations in factories vis-à-vis provision of facilities

Throughout the history of factory buildings, different developments have occurred in terms of building structure, interior arrangements and working conditions. Sundstrom (1986) argued that...

*"Factories and offices have changed over the past century. They now have to accommodate people who handle machinery or information. The evolution of workplaces reflected changes attributable to the development of technology and organisations as well as the continuity in the relationship between workers and workplaces."*⁴

Early factories differed from today's factories with respect to technology and information progress. Before the industrial revolution, production occurred on a small scale, usually in houses or adjoining workshops.⁵ Factory buildings had limited depth and width due to their reliance on water power. The first factory building built in England in 1719 for manufacturing processes was probably John Lombe's Silk-throwing mill.⁶

Developments in the 1890's revolutionised factory buildings. Steel-framed construction and reinforced concrete paved the way to build factories of just about any size and shape.⁷ Interior arrangements in factories were improved and power generation changed from water dependence to electricity and petroleum products.

The factories of the 1900's were of a different type. The electric motor allowed unlimited flexibility in the arrangement of machines. Steel-framed construction reduced interior supports to a few narrow pillars and allowed large windows. Electric lighting provided uniform illumination. These developments culminated in the creation of huge, well-lit and nearly unobstructed work areas.⁸

The increasing demand for goods resulting from the expanded market coverage and the introduction of new products created a new industrial trend. As entrepreneurs became more attracted to industrial businesses so more and more factories were built and competition grew simultaneously along with the demands for fine finished products. As a result, the focus of the management shifted from growth to efficiency. Many newspapers carried stories relating to the sordid working conditions in many factories. Labour Unions fought for better working environmental conditions and higher wages. These were some of the reasons why factory buildings sought better designs with improved environmental conditions and architectural orientations. Many industrialists were of the opinion that attractive buildings produce better work. As Diemer (1921) argued...

*"It was desirable that the building presents a pleasing appearance rather than that of an ugly monster or prison."*⁹

Not only have building appearances changed nowadays but the nature of the work has changed tremendously. Teamwork has become an important issue in modern factories where interrelated tasks have to be done.

The labour union movement in the early 1900's alerted employers to improving the working conditions or to suffer workers strikes. The labour laws passed during the first two decades of the twentieth century (1915-1920) contained provisions demanded by labour unions. Welfare workers attempted to motivate employees not to join unions.¹⁰

Industrial workplaces in the late 1800's became an important issue due to the emergence of the international health codes and regulations both in the United States and Europe. Working conditions in the United States during the 1880's varied greatly

from one factory to another.¹¹ In Great Britain and Europe, working conditions in factories started to improve during the same period due to the activities of social reformers.¹²

The regulations coupled with new legal pressures drove factory owners to improve their working conditions. Others did so with the hope of increasing their profits.

A report from the national cash register company revealed that in 1892, registers worth over \$50,000 were returned because of defective workmanship. More attention were given to employee to make them better workers. Welfare work were introduced that resulted in a better product.¹³

Working conditions have improved tremendously. Management perceptions have changed resulting in the redesigning of factories where work can be performed by groups. Workers are assigned to more satisfying and motivating jobs. The single specialised operation has been replaced by a series of interrelated tasks divided among the members of a work group.¹⁴

One can conclude from Sundstrom (1986) that there was an important need to improve workplaces in order to achieve organisational goals and objectives. Sundstrom stated that the psychology of the workplace requires an understanding of some recurring issues in the evolution of the office and factory: comfort and efficiency, communications and interpersonal relationships and the productivity and effectiveness of the organisation.¹⁵

In industrial sectors and particularly in factory buildings, there are important physical elements other than the machinery that directly and indirectly affect the working and organisational performance. Lounges with their physical elements are

one of the aspects relating to the quality of non-working spaces within the factory building which need to be studied carefully because they are where most of the informal communication among workers takes place.

1.4 Work environment/productivity and organisational effectiveness

Workers normally spend 30 to 40 percent of the day in places where they work. Their working environment should be conducive to making them feel more relaxed with a high self esteem and interested in the performance of their work.

Environment psychologists and sociologists are explicit about wanting to influence the nature of the experience and behaviour of workers by creating physical settings congruent with and supportive of specified individual, organisational and community goals.¹⁶ Their intention while working at the facility level is to promote the organisational development, though seldom labelled as such. The premise has been that research which clarified human/environment relations would provide a solid empirical basis for making design decisions aimed at determining the nature and quality of the built environment.¹⁷

Social interaction among workers became an important issue in enhancing job attendance and further reduce absenteeism. Whyte (1948), stated that...

*"the importance of physical setting lies in the kind of work and social behaviours it facilitate. Being a member of a closely knit social group motivates people to go to work regularly. The friendships and social interaction of the group, rather than the work itself, provide the incentive for job attendance."*¹⁸

Whereas, Sundstrom (1986) indicated that....

*“people and their physical environments exert mutual influence and represent interdependent elements of systems. Key results of the mutual influence are labelled as outcomes.”*¹⁹

Informal communication is therefore considered to be one of the vital issues in workplaces which has been discussed mainly in Western communities. There have been few attempts to study Eastern countries like the Middle East, particularly in Saudi Arabia which is strange considering that Saudi Arabia is one of the fastest developing countries in the Middle East, with its rapid diversification from oil dependency to an industrial economy.

In particular, this research discusses the link between informal communication and physical design features provided to workers in Saudi Arabia light industrial work places.

1.5 Saudi Arabia as a research setting

Since the 17th century, industrialisation has been the central feature of development throughout the world. The power of an economy lies in its industrial capabilities. The post-war experiences of developing countries show industrialisation to be closely correlated to rising incomes. Theorists identified the shift of resources from agriculture to industry as the central feature of this transformation.²⁰

The relation between industrialisation and economic growth has become a subject of continuing controversy. The rise in the share of manufacturing output and employment as per capita income has increased.²¹

In Saudi Arabia, the industrialisation of its economy depends on the export of crude oil which started in the 1960's.

The Saudi government, recognising its dependency on oil has continually worked to diversify its economy.²² Indeed, Robert D. Crane, an American management consultant noted that the principal evil in the Saudi economy is its dependence on oil while the principal saviour is the Saudi commitment to a free economy.²³

While acknowledging the limitations of a single-commodity economy, the planners of Saudi Arabia saw the country's potential in its natural resources. They argued that the key to bolstering the weakness of their single-commodity economy lay in diversifying significant elements within the economy. As a result, the Saudi government assigned the manufacturing sectors a larger role in moving towards achieving the objectives of diversification.²⁴

In 1974, the Saudi government announced the main principles embodied in its industrial development policy. One of the principles was to stimulate and expand industries that could contribute effectively to increase the national income. The adoption of the country's five development plans particularly, the Fourth Plan (1985-1990); the Fifth Plan (1990-1995) and the Sixth Plan (1995-2000) emphasised the roles of the private sectors, particularly the industrial sector in the nation's economic building.

The government's huge capital injection in the country's economy spurred an array of expansion from traditional trading activity to modern styles of manufacturing in a short span of twenty years. In addition, the government helped foster industrial growth by providing financial assistance at negligible rates.

The Saudi government launched an ambitious program of providing free vocational training and technological education to citizens throughout the Kingdom. The Kingdom's five year plan designed to achieve the maximisation of employing Saudi labour (Saudiisation plan), and started to replace the existing foreign labour in all spheres of industry. Graduates coming from the technological institutions and vocational training centres have likewise increased. This favourable situation has brought about an acceptable level of availability of local labour which was needed to transform the Saudi industries while not relying heavily on foreign workers, hired at high cost. However, the labour force in the industrial organisations has remained a mixture of both Saudi citizens and foreign nationals. The non-Saudi labour forces come from different countries, and they differ in ideological, social and religious backgrounds.

In order to attract young skilled Saudis to work in factories, workplaces in these factories need to be developed with better facilities with respect to working and non-working spaces within the factory building. Provisions of better facilities, and aesthetics could play a vital role in attracting and supporting young Saudi workers and lead to enhanced informal communication amongst them.

As this work also relates to the provision of facilities in factories, the choice of the industrial sector organisations was carefully studied, concluding that Jeddah city, is the most industrially-advanced city in Saudi Arabia.

According to a report published by the Jeddah Chamber of Commerce and Industry, 1995, the city has established 510 licensed factories in 1994, out of which 317 were actively working.²⁵

The Sixth development plan gives priority to the resumption of moderately rapid but steady economic growth and achievement of internal and external balances through the progressive elimination of both the budget deficit and the current account deficit. These priorities will be pursued through the continued structural diversification of the Kingdom's economy to create more employment opportunities for Saudi nationals, and the development of practical policies for privatisation and alternative methods of financing some government services.²⁶

Meanwhile, government credit agencies will increase their appropriation to SR 24.1 billion (US\$ 6.4 billion). In addition, the Plan envisages skilled training for its citizens. These steps are taken to ensure constant development of efficiency among Saudi labours to meet the requirements of the national economy.²⁷

To sum up, Saudi Arabia was selected as the venue of this research study due to the following reasons:

- a) It serves as a model sample for the Arabian Gulf countries moving fast towards an industry dependent economy;

- b) as per accessed information, no identical research work has been undertaken earlier in the Arabian Gulf countries or Saudi Industrial sector;
- c) to comply with the Saudi Arabia's Five Year Development Plan, especially the Sixth plan which stresses on the industrial sector;
- d) to develop further the findings by Campbell and Campbell (1988) in an industrial setting, using Saudi Arabia as a study setting.

1.6 Research contribution

The aim of this research is to contribute to the understanding of the role of the provision of physical design features on the level of informal communication in a manufacturing setting.

As a further contribution, a replica of Campbell & Campbell's (1988) study which was conducted in an educational setting will be adapted. A similar process of methodology will be used but in the manufacturing sector and in different cultural setting, *i.e.*, Middle East-Saudi Arabia. Thus, the findings could be compared for the purpose of future generalisation.

The significance of this study lies in the lack of previous empirical studies that correlates elements of physical environment with levels of informal communication in industrial workplaces. Other aspects of contribution lie in the inclusion of five sets

of new models. The first model demonstrates the role of communication and interaction in theories of organisations (16th century to 1990's). The second model illustrates the role of informal communication in theories of communication. The third model explores the role of the physical environment in theories of organisations and communication. The fourth model is an adaptation of Campbell & Campbell's (1988) model of informal communication in organisations demonstrating other elements of the total workplace that contributes to the level of informal communication. Finally, the fifth model illustrates the role of facilities management discipline in light industrial workplaces.

Moreover, this study contributes to the understanding of organisation management by combining recent knowledge with the theories of organisation, theories of communication and physical environment. It proposes that the facilities management discipline is an alternative way in managing organisations since it views organisations in a holistic manner taking into account internal and external aspects of organisations.

1.7 Research implications

This research examines the impact of the provision of physical design features on levels of informal communications in manufacturing workplaces, it further identifies the key elements that influence levels of informal communication.

Consequently, the findings will serve as a better guide for factory building design teams as well as providing evidence for future decision makers to select and invest in the elements of the physical environment. Moreover, an implication for

future research will be suggested since this study focuses mainly on one factor affecting the level of informal communication which is the physical design features.

In addition, further studies need to be conducted investigating the role of other elements of the total workplace that could predict the increase of levels of informal communication such as; the quality of spaces with respect to environmental and aesthetics features; layout of spaces wherein physical elements are related to each other and to the users. Finally, future research needs to explore the impact of administrative and social setting on the level of informal communication and these possible studies need to be conducted in office workplaces as well as industrial workplaces.

1.8 Research presentation plan

This research is divided into ten different chapters. Each chapter concludes with a summary of the chapter's discussion.

Chapter One, the Introduction, gives the historical background to the development of the workplace in general and the industrial workplace development in particular. A brief discussion shows the importance of industry to economic prosperity. It also illustrates the research objectives, its context and importance. A general outline of Saudi Arabia's industry and economic context is also provided since it is the study setting.

Chapter Two discusses various theories of organisations and emphasises communication issues in organisations. These include the classical theories, humanistic theories, system theories, organisational dynamic theories and the organisations of the future. As part of the research contribution, a new model will be formulated to investigate the role of communication in theories of organisation.

Chapter Three reviews the role of informal communication in theories of communication. A brief presentation is given concerning informal communication which also discusses the corporate communication process and how it relates to organisation. Moreover, this chapter provides a model illustrating the role of informal communication in theories of communication.

Chapter Four starts with an overview of the industrial workplace and social behaviour, followed by a discussion illustrating the role of the physical environment in organisational theories. Industrial workplace spatial structures and social pattern will also be discussed, as well as a list of supportive facilities in the industrial workplace particularly in gathering places which is the concern of this study. Moreover, this chapter will provide a new model illustrating the role of the physical environment in theories of organisations and communication.

Chapter Five discusses the objectives of Saudi Arabia's Five development plans with great emphasis on industrial organisations in particular. It also outlines the labour market and the role of the private sector in Saudi national economy, the development of Saudi industrial organisations, Saudi labour regulations and the Saudiisation issues.

Chapter Six describes the research methodology and methods of data collection. The presentation details research importance, the objective, and its hypothesis, followed by the methodology. It presents the research study setting, test sample, method of data collection, tools of measuring informal interaction and a discussion on measurement of study variables.

Chapter Seven deals with the testing of the research hypothesis on study incorporated variables. An analysis of the levels of informal communication in lounges and the influence of physical design features is presented.

Chapter Eight deals with the spatial and physical status of the research case study. An analytical illustration of each test sample is examined in relation to different spatial activities among factory divisions.

Chapter Nine discusses the research findings and the implications of the whole research study, describing the study objectives, research interpretation, its limitations, implications for future researches and for factory building designers.

Chapter Ten gives an overall conclusion of the study by describing the findings of the whole research. The discussions in Chapter's two, three, and four are linked to each other and proposed facilities management discipline as alternative approach for future organisations.

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CHAPTER - 2

ORGANISATIONAL THEORIES AND INFORMAL COMMUNICATION

2.1 Overview

The aim of this chapter is to give a brief historical background as well as literature review of the role of communication within the evolution of organisation theories.

Organisation theories have gone through different stages of development over time. The need to re-define the composition, structure, goals and characteristics of organisations has become a major concern which links formal and informal communications and the level of interactions. The development of organisation theories from the macro to micro level of study has also been a major concern and includes behavioural aspects of the workers.

Different theories have emerged through the evolution of organisational theories including classical theories which emphasised bureaucracy in organisation structure, humanistic theories which recognised human aspects of the workers, system theory with a balanced relation between human/social and technological systems of organisation, organisation dynamic theory which has gradually recognised the need for communication patterns in organisations, and finally, organisations of the future with strong emphasis on communication networks among employees.

The organisation theories of the 90's call for a new type of organisation, that is, the knowledge and learning organisations, where, employees are encourage to interact and exchange ideas in a learning and knowledge sharing process in a team and group structure.

This chapter also aims to illustrate the Sundstrom (1986) model of the Role of the Physical Environment in theories of organisations, and develop it a step further towards the relationship of communication models with organisations.

The argument of this chapter focuses on the growing recognition of levels of communication in organisational theories which lead to an awareness by the organisations of the need to spend more effort on their workplaces for better productivity and overall organisational performance.

2.2 History of organisation theories

The ideas that make up the body of organisation theory are numerous and different. Besides, there is no universally accepted way of classifying them. Each and every writer introduces a somewhat different picture; some include organisation behaviour theories and some do not.¹ For the purpose of this study, each organisation theory will be examined according to its evolution in relation to its consideration of human aspects of workers, and particularly workers communication and their level of interaction in the workplace.

Organisation theory was identified by Pugh (1966) as a term that refers to the study of organisation design and function.² Although work organisations existed throughout recorded history, they were not subjected to serious study until the twentieth century. And even then, the primary effort was directed towards giving practical advice on how to manage, rather than on gaining a deeper insight into what organisations are and how they work.³

The situation changed dramatically by the middle of the century. All the social sciences, including psychology, had become interested in studying work organisation, and a whole new multi-disciplinary field called organisational theory (OT) had begun to emerge.⁴

The macro theories from management science and sociology dominated organisations and focused on the organisation as a whole rather than the individuals and groups. The emphasis shifted in the later 1960's to a more micro level as psychological theories of personality, motivation, perception, attitude formation, leadership, and group behaviour took over. Invariably, the focus on micro issues involved the behaviour of individuals and groups rather than entire organisations.⁵ Eventually, the micro perspective assumed an identity of its own, under the label of organisational behaviour (OB), and organisation theories reverted to their original preoccupation with macro issues of structure and design.⁶

Feudalism theory has been in existence since the 16th and 17th centuries. Capitalism and bureaucracy grew out of a movement beginning in the 16th and 17th centuries to make European business enterprise more rational. The movement followed centuries of feudalistic organisations of work which were characterised by nepotism, favouritism, and discrimination.⁷

Classical organisational theory arose as a response to changes in the governments in Europe at the end of the nineteenth century. As government became more democratic, and as the industrial revolution brought more workers into formal organisations, structures necessary for administering and controlling organisations also

changed. It is characterised by an emphasis on structure, the framework that governs the interdependent parts of an organisation.⁸

2.3 Classical organisation theory

The classical design of organisational theory was formed by different theorists. One of its originator's was Max Weber (1864). He envisaged the use of "bureau's" to hold an organisation's policies and procedures, hence, the term *bureaucracy*.⁹ Weber was a very perceptive observer of history, and noticed that the story of society and the rise of civilisation was a story of power and domination. He noted that different social epochs were characterised by different forms of political rule, and that it was essential for them for two reasons: (a) to gain legitimacy and (b) to develop some kind of administrative apparatus to sustain their power.¹⁰

Moreover, Weber observed that the bureaucratic approach to organisation mechanised the process of administration. Unfortunately, this mechanisation process squeezes out the human dimension. He expressed this as follows:

*"The decisive reason for the advance of bureaucratic organisation has always been in purely technical superiority over any other form of organisation. The fully developed bureaucratic mechanism compares with other organisations exactly as does the machine with non-mechanical modes of production. Precision, speed, unambiguity, knowledge of the files, continuity, discretion, unity, strict subordination, reduction of friction and material and personal cost. These are raised to the optimum point in the strictly bureaucratic administration. Its specific nature.... develops the more perfectly the more the bureaucracy is "dehumanised", the more completely it succeeds in eliminating from official business, love, hatred, and purely personal irrational and emotional elements which escape calculation."*¹¹

Weber further believed that bureaucratic design structure would increase the speed and precision of work activities, minimise the ambiguity in work roles, and reduce interpersonal friction. In other words, people would know their jobs and be able to work together as smoothly as the parts of a well-oiled machine.¹² However, the bureaucratic design can have harmful effects on some employees, as suggested by Argyris (1965) based on extensive experience. One lesson concerns the impact of structure on people. However, social scientists did not fully appreciate the need for organisational designers to consider the person. Bureaucratic prescriptions focused on structure and ignored the human element. The second lesson that was learned concerns the impact of external conditions. A design that works at one time does not necessarily work at another time or in another place.¹³

Formal bureaucratic structure is characterised by high division of labour, high departmentation, unity of control, centralised decision making and limited communication channels. Table 2.1 briefly summarised the characteristics of the formal bureaucratic structure.

Table 2.1 Characteristics of the formal Bureaucratic structure¹⁴

<i>High division of labour</i>	High job specialisation Close supervision of work Narrow span of control
<i>High departmentation</i>	High horizontal differentiation Line-staff organisation
<i>Unity of control</i>	Strict chain of command High vertical differentiation Tall organisational structure
<i>Centralised decision making</i>	High formalisation Limited delegated power Written rules and procedures Formal, written communication
<i>Limited communication channels</i>	Little upward communication Little lateral communication Narrow communication channels

Source: *Psychology at work* by Berry, L.M & Houston J.P., 1993, WCB Brown & Benchmark.

Henri Fayol (1841) worked for many years in the French mining industry. From his very long life managing mining and metallurgical companies, he was able to publish his ideas on organisation, often referred to as functionalism. Functionalism, like bureaucracy, recognises the paramount importance of structure and Fayol's principles were very influential in providing a framework for understanding the structure of many organisations.¹⁵

The following are Fayol's fourteen principles of organisation: 1- division of work; 2-authority and responsibility; 3-discipline; 4-unity of command (everyone recognises the leadership); 5-unity of direction (everyone works for the same goals); 6-subordination of individual interest to the general interest; 7-renumeration; 8-centralisation; 9-scalar chain (line of authority); 10-order; 11-equity (justice); 12-stability of tenure; 13-initiative (enthusiasm about the task) and finally 14-esprit de corps. In one sense, Fayol's principles can be considered as an elaboration of the principles of bureaucracy.¹⁶ However, Fayol's schema is slightly more psychological than Weber's study.¹⁷

Scientific management theory introduced a new dimension, focusing on work behaviour. One of the founders of what is called scientific management theory was Frederick Taylor (1911). Taylor is associated with the well-known concept of time-and-motion studies, which attempted to consolidate jobs by identifying unnecessary or ineffective work behaviour.¹⁸

During the last year of his life, Fayol commented on the relationship between Taylorism and what was already being referred to as Fayolism in France. Urwick (1916), a writer with special references to the work of Fayol, observed that the work

of Taylor and Fayol was, of course, essentially complementary. They both realised that the problem of personnel and its management at all levels is the key to industrial success.¹⁹ Therefore, subordination of the individual interest to the general interest, dehumanises labour and neglects human individual interests.

To ensure that the goals of the worker and the enterprise coincide, much more is required than merely time study and incentive wages. Taylor expressed the view that a total reconstruction of attitudes and a decisive shift in the relationship between management and workers was needed. He also considered that scientific management, if properly applied and fully accepted by the parties, would create an atmosphere of trust, harmony and mutual prosperity.²⁰

Taylor's idea of scientific management was founded upon four premises as follows: 1- finding the 'one best way' to perform the job; 2- systematic personnel selection and placement to match the best worker to each job; 3- strict division of labour between management and workers; 4- monetary incentives to attract and motivate workers to perform optimally.²¹

Following on from Taylor's scientific management, co-ordination theory began to emerge. Mooney and Reiley (1931), published a book that had an important influence on a generation of managers. The book *Onward Industry*, was based on Fayol's principles of organisation functioning and emphasised in particular the principle of co-ordination. Mooney and Reiley believed that effective co-ordination in an organisation depends on four conditions. First, there must be authority, second, there must be mutual service, third is doctrine, fourth is discipline.²²

Mooney and Reiley's theory is of particular interest because of its slight shift away from an emphasis on structure. In their view, successful organisational functioning results from effective management of resources, not the development of scenarios to cover every conceivable situation.

At about the same time a study by Hawthorne (1920) emphasised the importance of employee attitudes and morale. Hawthorne's work at the General Electric Company in Chicago in the late 1920s and 1930s remains the most influential organisational research of all time. The results of these studies made behavioural scientists aware, for the first time, that worker behaviour could be influenced by factors other than monetary incentives.²³

Through a series of experiments, Hawthorne's research concluded that employee attitudes and morale and the influence of the informal work group were major determinants of productivity. From these conclusions he conceptualised the organisation as a socio-technical system in which 'the technical organisation and the human organisation are interrelated and interdependent.'²⁴

2.4 Humanistic theories

In the 1950s and 1960s, organisation theorists began to be concerned about the impact of the organisation on the employee. This concern soon became something of a social movement towards better human relations at work. The movement can be traced to the classic Hawthorne studies, in which it was discovered that the social organisation of work could affect work behaviour and productivity.²⁵

The human relations movement resulted from experience with bureaucratic organisation. Critics of bureaucracy pointed out that employees have many capacities that ordinarily go unused. If employees are treated well, these capacities might become available to the organisation. If they are treated poorly, their capacities may turn towards sabotage. From a human relations perspective, workers were not treated very well in bureaucratic organisations.²⁶

Different theorists had an input in the humanistic theories, among them was Abraham Maslow's (1943) Need-hierarchy theory. This was historically important and has received much attention from managers and other practitioners.²⁷ According to Maslow's definition of his Need-hierarchy theory, people are motivated by five types and needs: physiological needs, safety needs, social needs, ego needs, and self-actualisation needs.²⁸ The social needs of workers are considered the third level of needs according to Maslow's categories of needs. Workers need respect and positive social relations from their co-workers. They need to be liked and to have meaningful social interaction. When the workers are satisfied with the social structure, they will next want to fulfil their esteem needs- they will want to achieve, be competent, and gain approval and recognition.²⁹

Herzberg (1957), came up with a new theory called the Two-Factor theory. This theory assumes that everyone has two types of needs, that is hygiene needs and motivator needs. Hygiene needs include factors extrinsic to the work itself, such as the work environment, supervision, and pay. Motivator needs include intrinsic factors, such as achievement, recognition, and work activities. When hygiene needs

are not fulfilled, the worker is dissatisfied. When hygiene needs are fulfilled, the workers is not dissatisfied.³⁰

The Herzberg two-factor theory came as a result of an empirical study conducted to test his hypothesis. Over two hundred engineers and accountants were interviewed about their jobs; these workers were asked to recall job-related incidents that were associated with especially good and bad feelings. These data indicated that good feelings were associated with such job-related recognition, and work, tasks, activities. On the other hand, bad feelings were frequently associated with working environmental conditions, supervision, salary, job security, organisational rules, practices, and interpersonal relationships at work.³¹

Interpersonal interaction was stressed by Homans (1950-1974) in the Human Group theory. The external system is the state of three elements (interaction, activities, and sentiments) and of their interrelations, it constitutes a solution, not necessarily the only possible solution to the problem: how shall the group survive in its environment? It is called external because it is conditioned by the environment; it is called a system because in it the elements of behaviour are mutually dependent.³²

One of the defining characteristics of both a formal and informal group is the establishment of acceptable behaviour for group members. In the case of formal groups, norms are usually defined and known to their members. Norms for informal groups, on the other hand, are often unstated or unrecognised and are usually taken more seriously than those of the formal group.³³ Moreover, in both formal and informal groups, norms serve a variety of useful functions. They provide guidelines for unsocialised individuals to fit into the ongoing group. Norms also provide standards

of behaviour that facilitate interaction between members, and a means of identifying with one's peers.³⁴

Likerts (1961) proposed a development theory which is called Four-function Typology theory, which identifies four systems of management. According to Likert, the style by which any management deals with its employees can be characterised by one of the four systems. System 1, exploitative authoritative where all decisions are made at the top, communications come from the top and fear is used to motivate workers. System 2, benevolent authoritative, allows for some upward communication, both rewards and punishments are used to motivate workers, but decisions are still made at the top. In system 3, consultative, rewards are more emphasised than punishment, there is limited communication upward and decision making is influenced by employees. System 4, participative, which is Likert's ideal type, employees are encouraged to reach high levels of achievement and satisfaction through their work, there is open communication at all levels and employees have a direct contribution to decision making. Likert came to the conclusion that supervisors who focus their attention mostly on getting the job done are less successful than those who put greater emphasis on human relations.³⁵

Argyris (1957), developmental theory, argues that an individual's relationship with an organisation can be considered as a process that resembles human development. Accordingly, the over riding goals of the organisation are better served by helping workers to develop their potential, rather than keeping them in a dependent form. Workers who are allowed the freedom to become autonomous will take greater responsibility for their actions, and will be more productive.³⁶

McGregor (1957), pointed out that the design and operation of any organisation reflect certain assumptions about the nature of human behaviour that can be seen in the way the organisation is managed. He presented two perspectives-Theory X and Theory Y- as philosophical positions on management.³⁷ McGregor suggested gradual decentralisation and more delegation of responsibility to employees. Enlarging jobs at lower organisational levels would help employees accept responsibility, giving people a voice in the organisation, and allowing them to participate in decision making. Participation might encourage employee commitment to organisational goals and satisfy personal needs at the same time.³⁸

In brief, it can be concluded from the above overview of humanistic theories that the main characteristics of the humanistic theories are their emphasis on individual needs and group relations, and communication within organisational structure. Whereas, organisational critical functions are ignored.

Production, the basic function of any organisation, was typically ignored in the writing of the human relations theorists. Emphasis on group relations, improved communication, and worker self-actualisation were often given precedence over other areas more critical to organisational survival. It sometimes appears that to the human relations movement, the quality of social interaction at work was more important than getting the work done.³⁹ As a further development in organisational theories, system theories were propounded by different theoreticians as an alternative to classical and human theories.

2.5 System theory

In contrast to both classical and human relation schools, system theorists reject universal principles of organisation in favour of a contingency approach. Organisations must be studied in terms of the factors in their environments that are affecting the way they operate.⁴⁰ Modern organisational theory considers the organisation to be a system rather than a formalised structure or simply a network of social relations.⁴¹ Different theories emerged within the context of the system theories approach. One of them was put forward by Trist & Bemforth (1951). They provided a new concept theory named 'socio-technical theory', which emphasises the necessity of a balanced relationship between the human/social and technological systems of an organisation. It suggests a work group, or team approach rather than an individual one.⁴²

The post-war impact of mechanisation on traditional industrial systems of work resulted in a new model of organisation as a socio-technical system focusing on the problem of job and organisation design.⁴³ The socio-technical approach grew out of a new classical study of technology and the coal mining industry in Britain after World War II.⁴⁴

Historically, miners had always worked together in small teams, with each team being responsible for a specific section of a mine.⁴⁵ To the surprise of management, the introduction of technology into the mine had a disastrous effect on the workers. Social relationships were destroyed, autonomy and responsibility were reduced, and workers no longer took pride in their levels of skill. Outside the mine, social relationships within the mining community were also disrupted.⁴⁶

Just as technology develops an organisation, theories are in constant development. Burns and Stalker (1961) proposed a mechanistic and organic system theory. They studied the adaptation of electronics and other firms to technological changes and identified two types of management systems referred to as the mechanistic and organic systems.⁴⁷ The mechanistic system is characterised by precise role definitions, centralised control, and hierarchical communication between superiors and subordinates. The organic system emphasises expertise over hierarchy, encourages lateral communication and emphasises information and advice over instruction.⁴⁸

Woodward (1965), studied approximately 100 British manufacturing firms to determine the relationship between organisational structure and company effectiveness. Woodward's work was among the first to suggest that no one theory of organisation is applicable to all. Organisations evolve on the basis of their functions. Woodward studies came to be known as the industrial organisation model. In her study of 100 firm's organisational communication modes, she found that based on their organisation, these firms could be classified into three categories. The first one is the 'process production firm' which is characterised by its need to produce products in anticipation of demand, and the favoured mode of communication is verbal, rather than written. The second category is the 'mass production or large batch firm'. In this type of organisation, written communication is favoured over verbal. The third category is 'small batch production system', where verbal communication is favoured over written.⁴⁹ As a result, a new theory emerged viewing organisations as a dynamic process which involved factors of external environment affecting it.

2.6 Organisation dynamic theory

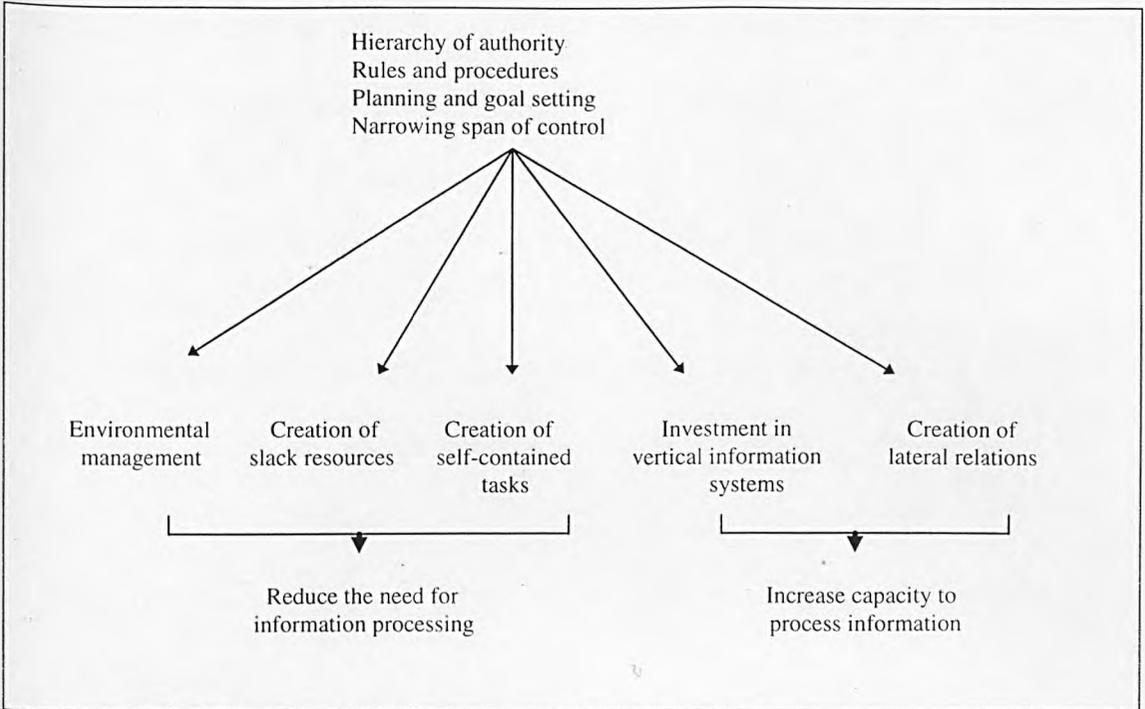
Two of the early theorists who investigated organisation dynamic theories were Lawrence and Lorsch (1967). They took Woodward's findings a step further and came up with the differentiation and integration theory, which suggests that different departments within organisations must also be structured. In contrast to Woodward, however, Lawrence and Lorsch found that the external environment of the organisation and not the type of production, determines structure.⁵⁰

Lawrence and Lorsch, referred to the different views of organisation departments as differentiation. Each department has its own concerns with its own goals such as sales, production and marketing departments. Moreover, the process by which these different views are brought together so that the organisation can function as a whole is a process of integration. Typical integrative mechanisms include communication channels between individuals of the departments as well as departments within the organisation.⁵¹

Galbraith (1972) provided an information processing model and stated that organisational structure is determined not by production method or environment, but by the process by which an organisation handles information.⁵² He suggested some strategies for improving information processing which include increasing the capacity of the organisation to handle information by increasing the flow of information between lateral units, and structure of the organisation will be modified by the information needs.⁵³

The following model illustrates Galbraith's view of information processing in organisations.

Table 2.2 Galbraith's Model of Information Processing⁵⁴



Source: *Organisation design by Galbraith, J.R., 1977: Addison-Wesley*

Furthermore, emphasis on employee's human aspect was furthered by the Theory Z approach. William Ouchi (1981) studied Japanese and American organisation and proposed the 'Theory Z' - which combines some of the better features of both the American and the Japanese styles of organising. The theory Z organisation offers long-term employment and moderate job specification. It is similar to Japanese organisations in that it includes employees in decision making and allows only slow career progress. Theory Z is also similar to American organisation in that it is not paternalistic in assuming responsibility for the employee.⁵⁵

Generally, the type Z theory of Ouchi was a citation from McGregor's Theory X and Y with the assumption that manager's opinions about workers would inevitably colour their management style. Ouchi also claimed that Theory Z organisations worked better because they avoided the worst elements of hierarchy and bureaucracy and achieved a high state of consistency in their internal culture.⁵⁶ As Ouchi put it,

"Type Z organisations were mostly described as clans - an intimate group of industrial workers who know one another well but typically do not share blood relations."⁵⁷

Therefore, work groups are one of the main characteristics of Theory Z. It combines some of the Western and Far Eastern styles in consideration of worker's human aspects in workplaces. As part of this development, the culture theory envisaged organisations as a culture with particular interest in communication within organisations.

Culture theory is one of the most recent developments in organisational theory, composed of a unique system of shared knowledge and values that has evolved over time.⁵⁸ Like cultures, organisations use various kinds of language and symbols to express their values and beliefs. For example, the climate or attitudinal warmth of an organisation can be detected in the symbols of authority, empathy, or rewards that are displayed in its reception room.⁵⁹

Organisational metaphors and myths show how an organisation behaves as a culture. A metaphor is a concrete phrase or term that we use to express or convey an attitude about an abstract idea.⁶⁰ A myth is an extended metaphor used to describe a complex situation in the organisation⁶¹

The methodology of culture study depends to some extent on what we believe to be true about how cultural information is transmitted. Some believe that culture is a central feature of communication in an organisation; therefore, the focus should be on how messages are sent. For example, we might examine supervisor-subordinate interactions and employee training sessions for cultural messages.⁶²

An emphasis on communication patterns within organisation is the main characteristic of cultural theory including interaction of workers and high levels of communication channel among them.

The new trend of management has been investigated by a number of writers. Waterman (1982), Kanter (1989) and Handy (1989) are all practising and internationally recognised management consultants. Their work attempts to predict the way in which future firms will need to organise and operate. Their views are based on what the best companies are doing now or planning to do in the future.⁶³

Peters and Waterman (1982), is one of the most discussed contributions to the emergence of new shapes of organisations. They studied the 62 most successful American companies and concluded that there are eight key characteristics which future organisations need to adapt if they are to achieve excellence.⁶⁴

Peters and Waterman's eight characteristics or attributes of excellent companies, are;

- 1- A bias for action: this focuses on a small team applied to solving designated problems in the organisation.⁶⁵
- 2- Close to the customer: the excellent companies are more driven by their direct orientation to the customers rather than by technology.⁶⁶
- 3- Autonomy and entrepreneurship: the ability to be big and yet to act small at the

same time. It encourages the entrepreneurial spirit among people, because they push autonomy markedly far down the line. Autonomy and entrepreneurship are encouraged by the type of no-holds-barred communication patterns which are characterised by informal meetings, physical and material support to communication systems, and finally the encouragement of intensive communication by giving freedom.⁶⁷

4- Productivity through people: in which workers are treated with respect and dignity as if they are partners, since they are seen as the source of quality and productivity.

Therefore, there is tough-minded respect for the individual and the willingness to train him, to set reasonable and clear expectations for him, and to grant him practical autonomy to step out and contribute directly to his job.⁶⁸

5- Hands-on, value-driven: setting up and implanting values in the organisation is a primary responsibility of the individual members of the management team.⁶⁹

6- Stick to the knitting: enhancing workers to move out mainly through internally-generated diversification, one manageable step at a time.⁷⁰

7- Simple form, lean staff: a guiding principle to keep things simple and small which will result in fewer administrators and more doers.⁷¹

8- Simultaneous loose-tight properties: by allowing the company to control everything tightly and in the meanwhile encouraging individuals innovations, autonomy and entrepreneurship.⁷²

2.7 Organisation of the future

The emphasis on individual and teamwork in a productive manner coupled with communication is the key stone of Peter and Waterman findings on the organisation of the future.

Rosabeth Moss Kanter (1989) is one of the America's leading management thinkers. Her work complements and develops Peters and Waterman's work by attempting to define what organisations need to be like in the future if they are to be successful.⁷³ Kanter recognises and calls for a revolution in organisational practice and has created what she terms post-entrepreneurial organisations.⁷⁴

As the post-entrepreneurial model carries profound implications for both organisations and their employees, Kanter draws attention to three areas where the changes will have a major impact on employees: reward systems; career paths and job security; and lifestyle.⁷⁵ In respect to worker's lifestyle, Kanter stresses the adverse cost that very intensive work patterns can have on people's physical and mental health and on their family life. She argues that:

"The workplace as a centre for social life and the workmate as a candidate for marriage mate is, on one level, a convenience for overloaded people who have absorbing work that leaves little time to pursue a personal life outside. It is also an inevitable consequence of the new work force demographics. But on another level, the idea is profoundly disturbing. What about the large number of people whose personal lives are not contained within the corridors of the corporation? What about the people with family commitments outside the work place?"⁷⁶

Senge (1990) is one of the theorists who have contributed to what have come to be known as 'learning organisation theory'. He described the learning organisation as an "organisation where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where, collective aspiration is set free, and where people continually learning how to learn together."⁷⁷ Furthermore, a learning organisation is of course about much more than performance measurement and appraisal. It is an organisation skilled at creating, acquiring and transferring knowledge and at modifying its behaviour to reflect new knowledge and insights.⁷⁸

It is often a problem to know how to begin in order to achieve a learning organisation. The crucial step is to identify what people truly desire to energise their passion and commitment. Then they need to develop disciplines, or paths of development, and continued learning. One discipline to follow is systems thinking: people should learn to react as a whole in respect to compounded events rather than to react in one way only. The second discipline is personal mastery, wherein individuals deepen their own skill, focus, and perception towards their environment. The third discipline is that, people should learn to accord and adjust their mental models to improve what is perceived and how it is interpreted. The fourth discipline is the development of a shared vision to provide a common identity and purpose. Finally, team learning is necessary to make the group smarter, and to keep the team effective as the vital learning unit.⁷⁹

The process of team learning starts from the shift from personal vision to shared visions. Individual interaction is an essential need for creating these share

visions but visions that are truly shared take time to emerge. They grow as a by-product of interactions of individual visions. Experience suggests that visions that are genuinely shared require ongoing conversation where individuals not only feel free to express their dreams, but learn how to listen to each other's dreams. Out of this listening, new insights into what is possible gradually emerge.⁸⁰

Learning is a lifelong process, it takes place in a number of ways. Learning theories explain how people acquire knowledge, attitudes, and skills. Senge's focus on individuals and on their thinking is well founded. Individual behaviour is a key building block of an organisation's effectiveness. Employee values, attitudes, personality, and perceptions are all decisive in shaping the quality of work. And team learning is at the heart of behaviour, it is a process of aligning and developing the capacity of a team to create the results its members truly desire, because it explains how people develop and how they might change or improve.⁸¹

From Senge's (1990) writing, he argued that, learning does not mean acquiring more information, but expanding the ability to produce the results we truly want in life. It is lifelong generative learning. And learning organisations are not possible unless they have people at every level who practice it.⁸² Organisations learn only through individuals who learn. Individual learning does not guarantee organisational learning but without it no organisational learning occurs.⁸³

2.8 Organisation theories *vis-à-vis* communication

The emphasis on individuals in organisations is one of the focal concepts of learning organisation theory. Furthermore, collaborative efforts of individuals and as a team are essential to achieve the desired goal within the organisational structure. Communication of individuals within the team overcomes and accomplishes the overall concept of learning organisation theory.

Handy (1989), in his book *'The Age of Unreason'*, demonstrated the profound changes which are taking place in organisational life, he stated:

*"The world of work is changing because the organisations of work are changing their ways. At the same time, however, the organisations are having to adapt to a changing world of work. It's a chicken and egg situation. One thing, at least, is clear-organisations in both private and public sectors face a tougher world-one in which they are judged more harshly than before on their effectiveness and in which there are fewer protective hedges behind which to shelter."*⁸⁴

He asserted that British companies are fast moving away from the labour-intensive organisations of yesteryear. In future, new knowledge-based structures, run by a fewer smart people at their core who control a host of equally smart computerised machines, will be the order of the day. He also contends that fewer, better-motivated people, helped by clever machines, can formulate much more added value than large number of unthinking groups.⁸⁵

Furthermore, Handy identifies three generic types of organisation that will dominate in the future namely: (1) Shamrock organisation, which is characterised by



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Table 2.4 Role of communication in theories of Organisations (16th Century - 1994)

Organisational Theory	Emphasis on Workers Relationship, Communication & Interaction
1- Feudalism Theory 16th and 17th century	Nepotism, Favouritism, Discrimination.
2- Classical Theory	
2.1-Weber, M.: <i>Bureaucracy</i> (1864 - 1920)	Dehumanising Workers-Mechanised process of administration Narrow Communication channels.
2.2-Fayol, H.: <i>Functionalism</i> (1841 - 1925)	Subordination of Individual interest to the general interest.
2.3-Taylor, F.W.: <i>Scientific management</i> (1911)	Dehumanised & Mechanised Workers, Splitting the function of Hand & Brain.
2.4-Mooney, J.D. , & Reileys, A.C.: <i>Co-ordination</i> (1931)	Recognition of Social Function.
2.5-The Hawthorne studies (1920 - 1930)	Influence Informal Work Group, Personal feelings of Freedom and Self-worth.
3- Humanistic theory	
3.1- Maslow, A.: <i>Need-hierarchy theory</i> (1943-1970)	Motivation associated with Social Interaction with Co-workers.
3.2-Herzberg, F.: <i>Two-factor theory</i> (1959)	Dissatisfaction associated with ignorance of interpersonal relationship .
3.3-Homans, G.C.: <i>The human group theory</i> (1950-1974)	Interaction between workers and emphasis on Group Norms.
3.4-Likerts, R.: <i>Organisational system</i> (1957-1967)	Success of job accomplishment associated with Human Relations.
3.5- Argyris, C.: <i>Developmental theory</i> (1957. 1964)	Emphasis on Workers potential and Freedom in workplace.
3.6-McGregor, D. : <i>Theory X and Theory Y</i> (1957)	“Value Employee Human aspects” Satisfy Personal Needs.
4- System theory	
4.1-Trist, E.L. & Bemforth, K.W.: <i>Socio-technical theory</i> (1951)	Emphasis on Individuals, Interactions, and Hierarchical Relationship.
4.2-Burns, T. and Stalker, C.M. : <i>Mechanistic & Organic theory</i> (1961)	Emphasis on lateral communication , information - advice over instructions.
4.3-Woodward, J.: <i>Functionalism theory</i> (1965)	Written and verbal communication - organisation function.
5- Organisational dynamic theory	
5.1-Lawrence, P.R. & Lorsch, J.W. : <i>Differentiation and integration theory</i> (1967)	Need for Communication process between Individuals and Departments of the organisation.
5.2-Galbraith, J.R.: <i>Information processing theory</i> (1972)	Information processing -Lateral Relations and Communication
5.3-Ouchi, W.C. : <i>Theory Z</i> (1981)	Emphasis on Co-operation of Individuals Communication
5.4-Allair, Y., and Firsirotu, M.E. : <i>Culture Theory</i> (1984)	Interaction of Individuals to form Shared Knowledge
6- Organisation of the Future	
6.1-Peters, T. & Waterman, R.H. : <i>Entrepreneurship</i> (1982)	Emphasis on communication of individuals and teamwork.
6.2-Rosabeth Moss Kanter: <i>Post- entrepreneurship Organisation</i> (1989)	Importance of teamwork with enhanced communication
6.3-Senge, P.M. : <i>Learning organisation</i> (1990)	Teamwork - intensive Communication channels & Informal interaction.
6.4-Drucker, P.F.: <i>Knowledge organisation</i> (1992)	Knowledge & information. Teamwork. Communication .
6.5-Handy, C. : <i>Knowledge organisation</i> (1989-1994)	Focus on individuals and teamwork to share Information - Intelligence. with major emphasis on Communication among them.

Source: *The Researcher* (1997).

Table 2.4 illustrates the relationship between each organisation theory and the role of communication. The Feudalism theory of organisation which dominated from the 6th to 17th century was characterised by nepotism, favouritism, and discrimination. Isolation of individuals was the main interest of this theory, and interaction and communication amongst workers were neglected.

Classical theories in general concentrated on the interdependent parts of the organisation. The bureaucracy concept emphasises the dehumanised workers, and the mechanised administrative process, with narrow communication channels being observed. In functionalism, the subordination of individual interest to the general interest of the organisation was key. Scientific management stressed splitting the function of hand and brain to the extent of dehumanising the workplace and mechanising the workers. The co-ordination theory gives more recognition to the social function within an organisation. Furthermore, Hawthorne supports the influence of the informal work group, and gives more emphasis to personal feeling of freedom and self-worth.

The evolution of classical theories with its gradual concerns of human aspects of individuals led to the emergence of humanistic theories, and set down a valued perspective towards workers well-being.

The need-hierarchy theory stated social interaction with co-workers as one type of need among workers motivation process. Moreover, the two-factor theory declared that dissatisfaction of workers is associated with ignorance of hygiene needs. The human group theory supports human relations and interaction and gives much emphasis to group norms. The organisational system theory proposed that the success of job accomplishment is closely associated with the emphasis on human relations

within workplaces. Workers personal freedom and potential were emphasised by the development theory. Furthermore, theory X and Y valued employee human aspects and satisfaction of personal needs by decentralising the organisations and by delegating more responsibility towards employees.

System theories basically followed the patterns of humanistic theories. Further stress was made on communication pattern within workplaces. Numerous theories emerged under the umbrella of system theory. Among them were the socio-technical theory; mechanistic theory; differentiation and integration theory and the information processing theory. To further balance the relationship between the human/social and technological systems, work groups and team-working should be considered. The mechanistic and organic theory stressed lateral communication information and advice over instructions towards work force, whereas the industrial organisation theory suggested that written and verbal communication within an organisation structure depends on the function of organisations. Information processing stressed lateral relations and communication within the organisation facade.

However, organisation theory is concerned with how an organisation could be designed to operate more effectively to achieve objectives in a 'rational' way.⁹⁵ Moreover, organisations are describe in three dimensions: complexity, formalisation, and centralisation. Complexity refers to the breadth of different activities, functions, jobs and number of levels which exists in the organisation, whereas, formalisation refers to the existence of policies, procedures, and rules which constrain the choices of members. Centralisation refers to the distribution of power and authority.⁹⁶

Furthermore, organisation culture is the set of dominant values, beliefs, attitude and norms that is the basis for justifying decisions and behaviour.⁹⁷ Just as organi-

sation structure influences behavioural stability, so does organisation culture, but in a different way. Differences in organisation culture explain why organisations in the same industry and with similar organisation forms are different, but the most obvious differences in behaviour patterns are apparent between organisation that are not in the same or similar fields.⁹⁸

2.9 Summary

Organisational theory development seems to be moving in the right direction, however, later theories describe a more complex set of variables and relationships than earlier ones. Later theories have also attempted to capture the dynamic relationship that exists between the organisation and its environment. Further, they have retained the focus on the individual in the organisation as an open system composed of a network of social and technical entities that are intricately woven into the surrounding environment. Moreover, organisations have a multiple existence, they can be understood as behaving like machines, like living organisms, or even like cultures.

As the literature review shows through the development of organisational theories, it is clear that there is a greater recognition of communication in both present and future organisations. The trend of today's organisation- 'knowledge organisation', is the focus on individual and teamwork, sharing information and intelligence coupled with a major emphasis on the communication process. This notion is considered to be the most fundamental aspect not only for organisations of the 1990's but also for future organisations as well.

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CHAPTER - 3

INFORMAL COMMUNICATION IN ORGANISATIONS

3.1 Overview

As can be seen in the preceding discussion in Chapter two, evidence shows that in the evolution of organisation theories recognition has emerged to strengthen communication patterns within organisations.

This chapter attempts to examine levels of informal communication in organisations from different perspectives. This is done first by illustrating the historical background of communication theories and its emphasis to informal communication. This includes the different models of communications such as: technological models; human behaviour models; process models; and organisational models.

The aim of this is to highlight the evolving recognition of group importance in the work setting as well as the levels of informal communication among workers in organisations.

The second perspective deals with the latest knowledge in the area of informal communication through corporate communication, in which much more emphasis was put on the need for strong internal communications, employees relationships with managers and face-to-face communication patterns. Third, a more focused illustration of communication flow and informal communication patterns will be examined in order to find the most appropriate ways to enhance levels of informal communication within the work environment. Fourth, work groups and teams will be examined to identify the different patterns of informal communication that best serve the effectiveness of group and teamwork. Fifth, a detailed illustration will be presented on the role of informal communication patterns in organisations. Discussions will be presented examining the worker's work-related fatigue, stress and rest periods, and

demonstrating alternative ways to improve their status by engaging in informal communication to alleviate the boredom and fatigue of routinary work.

3.2 The role of informal communication in theories of communication

Communication is defined in the Oxford English dictionary as the “act of imparting or exchange of information, letter, message or social dealings; connections or means of access. It is a science and the practice of transmitting information between at least two people.”¹

Although communication has been a research topic since antiquity (Aristotle’s Rhetoric is considered the first major work on the topic), the scientific study of communication in organisations is relatively recent.² Communication can be viewed in terms of either its process or content.³ Unlike many other phenomena studied in organisations, communication rarely has an identifiable beginning and end.⁴ Individuals have different styles of communicating and cultural variables too have an important impact on communication.⁵

Communication is considered as an important part of organisation psychology. Smither (1988) argued that,

“understanding communication is an important part of organisational psychology, since organisation simply cannot exist without means of communication.”⁶

Through the evolution of communication theory different models were found, each of which addresses an area of interest in viewing communication in organisations. Table 3.1 illustrates the role of informal communication in models of communication and discusses as follows:

Table 3.1 The role of informal communication in theories of communication

Communication theories	Emphasis on Informal Communication
1- Technological models:	
1.1- Aristotle's Rhetoric One-way process approach	Sender of the message attempts to persuade the audience. One way formal communication with no emphasis on social interaction.
1.2- Shannon (1949) Mathematical theory of communication.	Information is transmitted and received. Informal channels.
2- Human behaviour models:	
2.1- Westley, B.H., & MacLearn, H.S. Gatekeeper concept in communication (1957)	Communication process involves sender, receiver, gatekeepers messages and feedback communication as a static phenomenon.
3- Process models:	
3.1- Berlo (1960) Process model of communication (S-M-C-R)	Does not allow for individual messages to be isolated.
4- Organisational models:	
4.1- Lawrence & Lorsch (1967) Integrating personnel	Emphasis on teamwork and horizontal communication.
4.2- Galbraith (1971) Matrix organisation	Encourages horizontal communication channels.
4.3- Allen (1977) Episodi communication channels in organisations (ECCO)	Identifies the informal clusters of individuals who communicate within any organisation.
4.4- Davis (1977) Grapevine concept	Enhances informal communication structure among workers.
4.5- Shaw (1964-1978) Communication network	Group efficiency is affected by communication network structure.
4.6- Lewis, P.V., (1980) Organisational communication model	Individuals are both senders and receivers with different levels of communication skills, frames of reference and networks of association to the information sent or received.
4.7- Roy, D.F. (1960) Work group approach	Social interaction results in employees satisfaction and consequently contributes indirectly to organisation success.
4.8- Likert (1961) Linking-pin approach	Improves downward communication and group communication.
4.9- Forsyth (1983) Decentralised networks	In complex tasks decentralised networks and informal communication are more efficient.

Source: *The Researcher (1997)*

The first model of communication was proposed by Aristotle. He saw communication as a one-way process, in which the sender of a message attempts to persuade the audience.⁷

Although, Aristotle's one-way model provided the basic framework for understanding communication for many years, modern theorists consider it lacking in several ways. It does not account for feedback, which refers to the reactions of the receiver of a message, and the effect of these reactions on the sender of the message. Moreover, it ignores factors such as beliefs or perceptions of sender or receiver in addition to its neglect of the environment that might influence the communication. Communication is obviously a much more complex phenomena than Aristotle suggests.⁸

Shannon (1949), developed one of the early models of a technological approach emphasising noise which interferes with the accurate transmission and reception of a message within the flow of information.⁹ As was the case with Aristotle, Shannon did not take into account the role of feedback and its influence on the sender. Although the model is analogous to the operation of some computer information processing systems, it clearly does not model human experience adequately.¹⁰

Technological models of communication are typically developed by engineers and not psychologists, and consequently, individual differences between sender and receiver are often ignored. When this occurs, technological models of communication fail to account for the human variables such as attention span, attractiveness or power of sender, or the cognitive processes of the participant. Typically, no technological theorist sees the communication process as being straightforward and mechanistic. Although such an approach may be useful from an engineering stand-point,

its usefulness in understanding the interpersonal communication that occurs in organisations is limited.¹¹

The technological theory initiated the need for the emergence of human behaviour approaches, wherein, human elements affecting the communication process need to be investigated.

Westley and Maclean (1957), were two of the first human behaviour theorists who illustrated the process of communication as a static phenomena rather than a system with interdependent parts. The sender, receiver, gatekeeper, messages and feed-back aspects were taken into account.¹² Also, they introduced the notion of a gate-keeper into a communication model. They illustrated that in face-to-face interaction, a sender will be influenced by environmental forces that influence the messages sent to a receiver. The receiver, in turn, will provide the sender with feedback.¹³

As should be apparent from the preceding theories of communication, technological and human behaviour models are still limited since the view of communication is that it is a static phenomena. In keeping with current thinking about organisations as systems with interdependent parts, however, most researchers recognise that communication itself is part of an ongoing, interdependent system. Consequently, effective communication requires a constant adaptation to changing inputs.¹⁴

Berlo (1960), proposed process model communication, which represents communication as an interactive model with no beginning, end, or fixed order, and does not allow for individual messages to be isolated. They exist as part of a never ending flow, by using the five senses as the means for receiving messages.¹⁵ The process model has often been applied in social psychology.¹⁶ Moreover, McGuire (1969),

argued that factors such as the order in which information in a message is presented, the source of the message, primacy versus recency factors, and the persuasive nature of the communication are all recognised to have an impact on communication effectiveness.¹⁷

Although the process model has been used by theorists to describe the process of communication in an organisation, most models were originally developed to explain communication between two individuals.¹⁸

Lewis (1980) developed a model specific to organisational communication. Individuals are seen as senders and receivers with different levels of communication skills. There are frames of references and differences of networks of associations to the information sent or received.¹⁹ Through the evolution of communicational theories, the recognition of team and group communication is gradually accelerating. Likert (1961), initiated the linking-pin approach where group communication is emphasised.²⁰ Lawrence & Lorsch (1967), proposed the approach of integrating personnel and place, emphasising team work and horizontal (lateral) communication process.²¹ Allen (1977), provided the most common method for studying organisational communication through ECCO. Episodic communication channel in organisations works by following a particular piece of information through the organisation while dimensions of time and space are being noted. The analysis will typically identify the chains or informal clusters of individuals who communicate within any organisation.²²

The grapevine concept was proposed by Davis, and is considered as the fastest and most effective disseminator of information. Grapevine tends to be an important

act within organisation culture in which informal communication structures are enhanced among workers.²³

Shaw (1978), argued that evidence suggests that group efficiency is affected by the structure of the communication network. Shaw has suggested that when tasks become more complex a centralised position in the circle pattern seems to be more efficient to use.²⁴

A general view of organisation communication was proposed by Lewis (1980), in his organisation communication model. Individuals are seen as senders and receivers with different levels of communication skills, frames of references and networks of associations to the information sent or received.

The above overview of the historical background of communication theory makes it evident that specific focus on informal communication has not been investigated deeply by researchers in the field. On the one hand, the importance of informal communication can be drawn from Roy's (1960) work group approach. He argues that social interaction results in employees satisfaction and consequently contributes indirectly to organisation success.²⁵ On the other hand, the emphasis on the Grapevine concept was addressed by Davis (1977) as the the most important aspect of informal communication structure among workers. It can be therefore, concluded that informal communication systems have attracted moderate interest in organisational research for over a decade.²⁶

One of the aims of this study is to present an up-to-date approach to organisational communication and to explore the issue of informal communication in a research framework. It is also hoped to establish empirical evidence of the role of the informal physical environment on communication in an organisational context.

3.3 Corporate communication process

Several definitions have been associated with corporate communication, one of which was developed by the Southampton Institute, UK (1992). It viewed it as “those aspects of corporate activities which relate to the humanistically oriented facets of corporate life, such as knowledge of communication theory and development of communication skills related to interpersonal, small group and organisational communication. Often these functions are associated with a human resources approach to organisational effectiveness.”²⁷

For the purpose of this study, this concept, *i.e.*, corporate communication, will be dealt with respect to its emphasis on informal communication and elements affecting it. Informal communication is our concern, and to illustrate the role of the its relationship with the physical environment.

Furthermore, communication technology is the influential factor in affecting corporate communication process. Thompson (1996) believes that:

*“Communication theory is centred on process rather than information, but the changes in communication technology are affecting both the process of corporate communications and the balance of power that has resided with those who hold information. This power shift means that organisations can no longer manipulate their information assets - that is their useful and valuable information resources - to ensure a largely one-way communication, and pay mere lip service to the notion of corporate communication.”*²⁸

Moreover, enormous energy is being expended in communicating a great deal of information about key corporate issues, Tourish & Hargie (1996) argue...

*“Organisational success requires a high quality communication system between management and staff. There is now a growing awareness among manager that, in order to achieve managerial objectives, employees at all levels within the organisation should be informed about key issues so as to be able to contribute more fully to the success of the company.”*²⁹

Evidence suggests that effective internal communication brings large scale organisational benefits and is essential to achieve and maintain corporate success.³⁰

As Clampitt and Downs (1993) claimed in a wide-ranging review of the research, the benefits obtained from high quality internal communication include improved productivity and higher quality, reduced costs and increased levels of innovation.³¹

The need for the growth of an overall communication strategy in organisation is likely to be influenced by the latest trends in organisational restructuring. Central to the concept of organisational re-engineering is the creation of cross-functional team structures with a multi-purpose remit.³² Small teams which are socially integrated and generate high levels of internal communication tend to be much more productive in problem solving and goal attainment, as well as engendering greater member satisfaction.³³

A recent survey conducted by members of a UK university research unit, focuses on the development of the emerging field of corporate communication management. Over 1000 UK organisations, were surveyed by post, targeting directors and managers of corporate communications, public relations, human resource management and marketing firms. The purpose was to collate and interpret

the data generated in order to extract a snap-shot view of the structure, operation, and evolution of the embryonic management field of corporate communications.³⁴

What follows is an illustration of the 200 views that were captured by the survey. Firstly, there is limited evidence that electronic technology is making communication activities more dynamic.³⁵

Corporate communication management efforts are seen by corporate communication directors to impact on the business by facilitating people to do their work for the business, by explaining why as well what, and by improving satisfaction and thereby improving performance.³⁶

Corporate communications directors feel that the activities that will become more important in their organisation in the future will be dealing with specific stakeholder groups; internal communications/employees relationships with managers and face-to-face communication.³⁷

Moreover, some of the aspirations stated for development in corporate communications management in the next five to ten years were: communication to achieve involvement and ownership of business aims, decisions, activities, and contribution to achievements - greater recognition of the basic human need to communicate; back to basics - real open and honest face-to-face (two-way) communication; teaching of communication as a human art; the organisation's culture recognised as communication - closer relations between managers and staff - more two-way flow; and finally, communication incorporated into management responsibility and becoming part of management appraisal systems.³⁸

The response of external service professionals which were part of the targeted organisations in the survey included views from staff in communications, media,

employee communications and communications training and development consultancies. Agents indicated that...

*"...recent years have witnessed some increase in awareness and recognition of the role of communication in the business. Technological development are leading to the erosion of boundaries between the various media and communication channels and the in-house/out-sourcing question is less clear as new capabilities are affordable by the end-user. Foreseeable changes are throughout likely to focus on face-to-face methods and the behaviour of managers."*³⁹

The conclusion of the survey findings proposed that the accelerating drive for mediated communication, using e-mail, etc., is driven by the belief that communication is about information (substance or content) and that efficiency in moving information between people is a key business success factor. The serious error made by many managers is in mistaking substance for form.⁴⁰

Communication is a highly complex and dynamic interpersonal process of people relating to each other. Ineffective communications do not achieve real communication because they tend to emphasise techniques devised for sending and regulating the flow, and content, of information. Further, it is usually assumed that communication is primarily the responsibility of the sender and is a means of influencing, primarily passive, people. Too much emphasis is still given to selecting and refining media for getting the "facts" to the right people, when information alone has little chance of changing attitudes and behaviour.⁴¹ Many managers have yet to fully accept that they are responsible for the communication effectiveness of others as well as their own, and that effectiveness in communicating is not solely about

compelling presentations and polished written documents. People need to relate to others.⁴²

Furthermore, most people interpret the information they pay attention to in the light of their own needs, values, viewpoints and motivation which leads to the fact that communication is really about relationships between two or more people which consists of emotions and feelings, as well as tasks and subjects. A particular attitude, a range of styles and methods, and a particular socially-driven business discipline are required if communication is to become a mobilised source of sustainable competitive advantage, real progress, and quality of working life.⁴³

Leahey (1993) believes that high productivity performance, in some ways, depends on the quality of communications. He stresses that 60 percent of the working population is engaged in creating and processing information.⁴⁴

Dawson-Shepher (1994) supports the idea that there is a strong relationship between communication and performance.⁴⁵ Francis (1987) argued that corporate communication possesses four major segments of purpose for the improvement and effectiveness of organisational as well as individual performance, namely: sharing the vision or mission; integrating effort; making intelligent decisions; and sustaining a healthy community.⁴⁶

The successful organisational performance of an organisation varies largely through its communication excellence. Pumpin (1991) encouraged the view that the way of cultivating trust is through open communications, where comprehensive information helps to improve problem solving. In this way, motivation and identification are high.⁴⁷ Furthermore, Creelman (1996), suggests the key to high business

performance is to discover how human, organisational and customer intellectual assets can be balanced so that they can combine to create value.⁴⁸

According to Nickson & Siddons (1996), poor communication is the cause of practically all breakdown in business relationships.⁴⁹ Therefore, the combination of face-to-face informal communication needs to be well studied in terms of its different flow pattern to be able to implement it in the most productive manner. The next section will deal more with the flow and different types of communication.

3.4 Communication flow and informal communication

In a manufacturing type of organisation, different processes take place. The primary process is the act of making the components, the secondary process is concerned with assembly lines, and the treasury process is one of the supportive services to the core business, which has to deal with things other than task oriented production process. The treasury process is the concern of this study and in particular, the informal communication that takes place in an off-task moment between workers.

The point to address here is that, in the manufacturing industry, which is the concern of this study, other acts take place surrounding the stage of production process, wherein which communication flows in different directions and patterns. Therefore, this section will attempt to illustrate briefly the different types of communication flow that enhances face-to-face communication and informal interaction. These flows of communication should be well planned by the organisation to produce effective communication outputs that will benefit work effectiveness and performance.

Communication in organisation is a complex phenomena and that to allow communication systems to develop and function without planning can be disruptive to effective organisational function.⁵⁰

Communication flow is an important aspect of communication system planning and several writers as well as theorists have proposed different types of flow which can be classified into three types: Downward, Upward, and Horizontal flow.

Downward communication comes from superiors to subordinates. Katz & Kahn (1966) identified five types of downward communication as follows: (1) job instruction; (2) rationale for performing certain task; (3) information; (4) feedback on performance; and (5) ideology, which is communication about the goals and values of the organisation.⁵¹ One approach to downward communication often used in organisations is the linking pin which suggests that in organisational structure, each manager serves as the linking pin between subordinates and the upper level management.⁵²

Since downward communication is one-way, there is little opportunity for correcting mis-perceptions which leads to some major disadvantages, such as the lack of feedback; another problem is the lack of openness from managers who do not share information with others.⁵³ Moreover, evidence suggests that employees are more satisfied when communication is open rather than closed.⁵⁴

In many organisations, upward communication is believed to be inadequate by managers because they feel they do not receive enough of it, and by subordinates because they feel the managers are not interested in their messages. Messages from below are likely to be seen as too narrowly focused and not appreciative of larger organisational goals. Additionally, subordinates may feel the supervisor is too busy

to listen, or they may see themselves as being less articulate and persuasive than their superior.⁵⁵ Apparently, a survey of workers, found that, communication with superiors is one of the most important and satisfying aspects of their jobs.⁵⁶

The mechanistic and organic systems study of Burns and Stalker (1961), found that executives in mechanistic systems in particular were afraid of becoming isolated from the information flow. Being isolated is likely to lead to disruptions in the working environment since the effectiveness of downward communication is very much dependent on what is reported in upward communication.⁵⁷

In some organisations, managers are encouraged to practice an open-door policy toward subordinates. Subordinates are encouraged to talk to the manager anytime they have something to communicate. Although such a policy will undoubtedly increase the volume of upward communication, there is certainly no guarantee that it will increase its quality. Employees are still likely to distort information to serve their own purposes, and supervisors may suffer from information overload. The open-door policy is probably not workable in many organisational settings, but managers need to remember that the effectiveness of downward communication is clearly dependent on the quality of upward communication.⁵⁸

Horizontal communication was first recognised by Fayol (1949). It is more common than either form of vertical communication because it saves time, lessens distortion, and alleviates the workload of superiors.⁵⁹ Matrix organisations approach introduced by Galbraith (1971) outlines several ways in which organisations can foster horizontal communication and encourage direct contact with managers.⁶⁰

The preceding types of communication flow are more appropriate in the regular channels of organisation structure. However, it has been found that the most common

pattern of communication that exists in organisations outside the regular channels is the grapevine.

The term 'grapevine' is said to date from the American Civil War. David (1977) argued that since primitive telegraph lines spread by the armies from tree to tree during the Civil War typically resulted in distorted messages, any rumour that comes in is said to be from the grapevine.⁶¹

Smither (1988) pointed out that no discussion of organisational communication would be complete without considering the fastest, and often the most effective disseminator of information, the grapevine. It is an informal communication structure that spreads information outside regular channels.⁶²

The Grapevine serves several important functions by passing on information that would not otherwise be disseminated. It tends to be much faster than formal communication channels, and research suggests that most grapevine information is accurate.⁶³

Moreover, innovations in organisations flourish when the information flow is widespread, feedback is rapid, and when both mechanisms cut across traditional lines of authority.⁶⁴

3.5 The role of communication patterns in work groups and teams

A social system is a structuring of events or happenings; it has no formal structure apart from its functioning. In human societies the social structure is more complex; in all societies family relationships are important, and there is some degree of social stratification. All social interaction is to some degree pre-programmed, it has been worked out by previous occupants of the same positions. In extreme cases

interaction can depend almost entirely on the formal relations between people - for example at army drill parades, hospital operations, and many more. In moving to the consideration of the effects of organisation, a number of new concepts have to be introduced which may place its occupant at a certain point in a communication structure or work-flow system.⁶⁵

As illustrated in Chapter 2, in the discussion of the role of communication in theories of organisations, the evolution of organisation theories has led to a great recognition of work groups and team work.

A work group is a collection of two or more people who interact with one another and share some interrelated tasks goals. Interaction and inter-relatedness are the main characteristics that distinguishes a group from just a collection of people.⁶⁶ A work team is a type of work group, but a team has three specific properties. First, the actions of individuals must be interdependent and co-ordinated; second, each member must have a particular specified role; and third, there must be common task goals.⁶⁷

To be able to understand groups and teams, it is essential to understand the different group concepts including roles, norms, and group cohesiveness, and process loss.

The concept of role implies that not everyone in a group or team has the same function or purpose. Instead different individuals have different jobs and responsibilities in the group or team.⁶⁸ A role has been defined as a set of behaviours that a person is expected to show in a particular situation or setting.⁶⁹

There are two types of roles, namely, formal and informal roles. Formal roles are specified by the organisation and are part of the formal job description, while

informal roles arise from group interaction. Groups can invent roles that do not exist formally, or the group's informal roles can supersede the formal ones.⁷⁰ In the process of interaction, work groups define particular roles that individual members play. Everyone plays a variety of roles, the specification of a behavioural role includes the particular task's activities to be performed and the relationship of the role taker to other members of the group.⁷¹

The unwritten rules of behaviour accepted by members of a work group are called norms. These rules can cover everything from style of dress and manner of speech to how hard everyone works. They can exert a powerful influence on an individual's behaviour.⁷² Norms vary in the extent to which they are formally recognised. Research indicates that many informal work groups have productivity norms that are not recognised by the organisations, meaning group members are expected to produce a certain amount but no more than this.⁷³

It is common for work groups to adopt production norms that dictate how much each person will produce, especially in manufacturing plants where production is countable.⁷⁴ Internal agreement about group norms appears to improve the group's performance.⁷⁵ Specifically, when group norms and organisation goals are complementary, high degrees of effectiveness can result.⁷⁶

Work groups can have a bigger impact on member behaviour than supervisors or organisational practices.⁷⁷ In Coch and French's (1948) classic study of a pyjama factory with a piece rate system, the production norm among employees was 50-unit per hour of pyjama. When group members pressured one individual she restricted her output to 45-unit per hour. A short time later, the group was disbanded and within a matter of days, the worker's output increase more than doubled. Clearly, norms could

prove quite useful as a means of enhancing productivity if they could be appropriately directed.⁷⁸ Moreover, social norms affect the quality of communication in any organisation.⁷⁹

Furthermore, norms tend to be strongly enforced only in groups that are highly cohesive in force.⁸⁰ Group cohesiveness is the sum of forces attracting group members and keeping the group together. It is a group phenomena; and for a group to be highly cohesive, most if not all members must have strong motives to remain in the group.⁸¹

Group cohesiveness is an important and critical issue in the continuation of the group. Specifically in workplaces where people often depend on their jobs for their economic survival, the work group can be as important as the family, and threats to the well-being of the group are taken seriously.⁸²

Keller's (1986) study shows that members of highly cohesive groups tend to be more satisfied than members of minimally cohesive groups.⁸³ Similarly, some studies within organisations have found that highly cohesive groups perform better.⁸⁴

The last group concept in work group and teams is the process loss. It has been referred to as the accumulated time and effort expended on activities not directly related to production or task accomplishments.⁸⁵ It involves social activities, such as meals or conversation, that enhance group cohesiveness, which can be important for efficient group functioning.⁸⁶

Since different friction's can happened within group members such as norm violation by a group member or interpersonal conflicts, process loss can have a lot to do with the inefficiency that sometimes occurs in groups. Nevertheless, a certain

amount of process loss is necessary and may lead to better performance by the group.⁸⁷

There is a widespread belief that group performance is superior to individual performance for many tasks. This belief is based on the notion that something emerges in the interaction among people that enables a group to be better than the sum of its members.⁸⁸

The preceding overview of group concepts including roles, norms, group cohesiveness and process loss have provided evidence that individual importance is just as vital as group importance. On the other hand, it has become evident that informal communication patterns have a major effect on the way in which individual norms can be understood and effective cohesive groups can then be found.

In manufacturing organisations, new trends are developing specially in the process of assembly. For instance, according to Espector (1996) the autonomous work group idea has been adapted for manufacturing organisations, and as an alternative to the traditional organisation of a factory. It is also becoming an increasingly popular way of organising manufacturing organisations.⁸⁹

Work groups and teamwork require different enhancement acts, one of which is informal communication so that work tasks can be performed in better ways. It is presumed, that teams will perform better when their members can communicate and interact with one another effectively.⁹⁰ Moreover, most organisations are comprised of a network of interrelated work groups. In order for the organisation to function effectively, individuals must co-ordinate their efforts within their own groups, and groups must co-ordinate their efforts with one another.⁹¹

The different patterns of informal communication and social interaction will be further investigated in the next section.

3.6 The role of informal communication patterns in organisations

Informal communication systems have attracted moderate interest in organisational research for over three decades.⁹² Informal communication in this study refers to the relatively unstructured information exchange that tends to occur in face-to-face encounters in workplaces during 'off-task' time.

Communication is required in almost all jobs. It has been defined as the transmission and exchange of information, whether spoken or written. Information is conveyed through formal organisational channels of downward, upward, and lateral communication. It is also passed along an informal channel-the grapevine.⁹³ Individuals who interact frequently, often develop an identification with each other over time.⁹⁴ Communication tends to be much faster in the informal group than formal group communication.⁹⁵

Interpersonal aspects of organisations became a concern in different organisational theories. These theories describe how organisations work. Some focus on the structure of organisations, including the various components and how they interrelate. Others are concerned with the interpersonal aspects of organisations, including communication and how people relate to one another.⁹⁶

Smither (1988) suggests that the socialisation process is an important part of every worker's experience. Learning the ropes usually means more than learning how to perform job duties.⁹⁷ Similarly, Housel & Davis (1977), found that employees

valued face-to-face communication with their supervisors through either telephone or written communication.⁹⁹

The operations of groups and informal organisations influence the functioning of control systems. Thus, socialisation can create a feeling of commitment to the group and reduce the need for formal management control.¹⁰⁰

The frequency of communication amongst individuals within an organisational structure has been found to have a positive effect on the success of technical innovation.¹⁰¹ The richness of face-to-face contact can result in the reduction of uncertainty and stimulate trust and mutual understanding. Trust is required between the idea generator and those individuals that become involved with the creative innovation based thinking.¹⁰² Personal interaction and face-to-face communication are required to successfully articulate tacit understanding and knowledge.¹⁰³

There are many studies which involve and clearly identify the notion that face-to-face communication leads to higher levels of job satisfaction leading to a higher rate of productivity in return. One such study is by Muchinsky (1977)¹⁰⁴

Informal communication results in accurate, job-related information exchange, so work performance can be enhanced. Several studies support this relationship, but the distinction between informal and formal communication flow has not been clear.¹⁰⁵ Over the course of decades of study, the relationship of job satisfaction to other behaviour has been found to be much more complex than it was first thought. Satisfaction affects employee withdrawal, specifically absenteeism and turnover, but apparently, not by the same process. The effect of satisfaction on productivity is not clear, correlations between the two are not that strong, may be because important job and person variables are not being considered.¹⁰⁶

It seems almost common sense to say that satisfied workers are more productive and that productivity problems are solved by interventions that increase worker satisfaction. Although research has not revealed the simple, direct relationship that was expected, there has been enough evidence to maintain the position that satisfaction of employees will affect organisational outcomes. It is believed that satisfaction has effects on worker's performance and on behaviour related to citizenship, such as absenteeism.¹⁰⁷

It is common to evaluate and compare theories of communication by the extent to which they successfully predict job performance. Nonetheless, most communication theories are not intended to predict performance/productivity but rather to predict informal communication and social interaction. However, the distinction between behaviour and task/job performance is typically not made in broader theories.

To date, the efforts of industrial psychologists have been directed largely toward the study of rest periods. Rest breaks during scheduled work sessions are becoming rather common practice, providing time to have coffee, soft drinks, tea, and other refreshments.

One particular study was conducted by Elton Mayo in a factory for telephone components called 'Relay'. The study lasted over a period of five years and concerned a group of six girls. At the beginning of the experiment there was a test period of several weeks under the usual work conditions, that is a 48-hour week including Saturdays, 'with no rest pauses'. They produced 2400 relays per week. After this test period there was a further period of piecework during which production rose. Rest periods were introduced next and once more there was increase in output. Similarly,

at the end of the day, all the manoeuvres introduced led to an increase in productivity but the final outcome was very surprising. When all these improvements were suddenly removed, output, instead of declining, reached a new high level of 3000 relays per week.¹⁰⁸

The key to this fascinating result was that the girls themselves had been treated as important individuals, given all the proper time to rest for a while, to release tension and work stress and engage in social conversation amongst themselves.

Although such breaks are “good” in terms of various criteria (such as productivity and employee interactions), it must be stated that there is actually not much hard data available to support such an assumption, although there has been a lot of speculation about the accumulation of fatigue during the work period.¹⁰⁹

Furthermore, another research was conducted at the Hawthorne plant of the Western Electric Company. The project actually began as a study of fatigue. The research team planned to evaluate the different levels of work conditions affecting workers and productivity. One study evaluates the effects of rest periods. Actually, much more was done than simply introducing breaks. In the study, they were very anxious to have workers behave naturally at work so that they could see the effects of rests breaks and so they did everything to encourage natural behaviour. Workers were consulted on decisions affecting the project, asked their opinions, and allowed to talk while they worked. Surprisingly productivity remained at the same level.¹¹⁰

Although there is some evidence on rest periods to suggest that they typically develop informal social interaction and increase productivity output.¹¹¹ Several factors related to work stress should also be considered. Surveys were conducted identifying the source of stress or fatigue during working periods. Sources of stress

may influence an interpersonal exchange in several ways: by making people insensitive to social cues, by leading them to respond negatively.¹¹²

Stress for many years was studied mainly by medical researchers interested in physiological measures. Recently, however, stress has become of particular interest to industrial psychologists.¹¹³ Job stress involves complicated interactions between the person and the environment and a number of studies have explored mechanisms for coping with stress.¹¹⁴

A study conducted by Muchinsky (1990) about coal miners stated that...

*"Miners were very fatalistic about their lives. However, being fatalistic does not mean indifferent. Actually, working in a coal mine is a highly stressful way to earn a living. If miners escape immediate death or injury caused by a cave-in, they face the possibility of a long-term illness called "black lung disease" brought on by repeatedly inhaling coal dust. Miners get deeply stressed by continually facing these life-threatening conditions. And when they get off work, they often 'unwind' on themselves, their spouses, and their children. Spouses and children are convenient outlets for the pent-up fears and anxieties experienced at work by the miners."*¹¹⁵

One source of environmental stress is noise. Research in offices suggest that noise represents an important source of dissatisfaction with the physical environment and perhaps even with the job performance.¹¹⁶ Research on the psychological effects of noise on factory workers has been much less common than research on office workers. An early industrial psychologist wrote...

*..Noise of the machines in many factories makes it impossible to communicate except by shouting.. the labourers themselves usually feel convinced that they no longer notice it all.*¹¹⁷

One study linked noise from co-worker's conversations, telephones, and physical environment. Noise from co-worker's conversation has even been associated with job dissatisfaction among co-workers.¹¹⁸

Informal groups within the formal structure of organisation are considered to be an important event among organisational communication structure. Informal groups serve many personal purposes, not the least of which is to alleviate the boredom and fatigue of routine work. It is not unusual for people in apparently dull jobs to report that they enjoy their work.¹¹⁹ One good example of social interaction among members of a work group, is the observations of Roy (1959-1960).¹²⁰

Observers of offices and factories have for some time expressed the belief that pleasant surroundings lead people to be sociable while unpleasant or stressful environments contribute to poorer personal function. For instance, the gloom and unpleasantness of the surrounding lowers the vitality and makes workers and officials irascible and displeased with conditions. Little annoyances in the work which are passed over without any comment whatever are sufficient to cause loss of temper.¹²¹

Therefore, as the foregoing discussion suggests there is evidence which shows that informal communication and social interaction play an important role in individual and group satisfaction and effectiveness, and consequently on work performance. The correlation between workplace and informal communication will be further investigated in the next chapter.

3.7 Summary

As can be seen in the preceding discussion of the evolution of communication theories, informal communication and social interaction is becoming an important practice in organisations. Furthermore, human need for informal communication is becoming vital for an effective working environment.

One of the most significant ways to enhance informal communication patterns within a work setting is through face-to-face communication, where, effectiveness of communication can be achieved.

Moreover, in today's work setting work groups and teams are becoming more significant to organisational effectiveness and productivity where co-operation and co-ordination among workers can be best achieved through cohesiveness of the groups in which informal communication plays a vital role.

Finally, informal communication is found to be an important part of the social setting in manufacturing organisations. Managing the factory environment requires more understanding of the process of informal communication rather than just managing tasks and the manufacturing process.

The next chapter of this thesis will examine the role of the physical environment in informal communication within the manufacturing workplace setting.

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CHAPTER - 4

PHYSICAL ENVIRONMENT AND SOCIAL BEHAVIOUR IN THE INDUSTRIAL WORKPLACE

4.1 Overview

This chapter aims to investigate and explore the role of the physical environment on levels of informal communication among workers in the industrial workplace.

As discussed earlier in Chapters two and three, informal communication has become much more important to an organisation's effectiveness. Furthermore, Becker's (1981) concept of 'total workplace', indicated that the physical setting is one of the elements affecting informal communication, other aspects being the social and administrative setting in addition to quality and layout of spaces. For the purpose of this study, provision of support services through their physical elements will be of particular concern.

The first section will discuss the role of the physical environment in the evolution of organisation theories. An attempt will be made to formulate a new model illustrating the role of informal communication and the physical environment in theories of organisation and communication which proposes a link to the earlier arguments in Chapters two and three. The following sections will deal with the industrial workplace, in particular with respect to its spatial structure in which issues of informal communication and the spatial arrangement of the workplace is discussed.

A further investigation will be made regarding the role of information technology on the social behaviour of people in the workplace.

Moreover, elements of the physical environment will be considered in respect of workers behaviour and their workplace. Gathering places in workplaces and industrial settings in particular will be investigated in the last section.

4.2 The role of the physical environment in organisation theories

As discussed earlier in Chapter two, and three, through the evolution of organisational and communication theories there has been a recognition of informal communication, and later theories are focused on organisational dynamics with a holistic approach.

From the onset of the feudalism approach, when, premeditated nepotism, favouritism, and discrimination of workers were being practised in an organisation, no attention was paid to how the physical environment affected worker's needs as human beings.¹ These followed the development of classical theories, including Weber's (1864), bureaucracy concept, Fayol (1841), the functionalism concept, Taylor (1911) with his scientific management approach, Mooney & Reiley (1931) with their co-ordination concept and later the Hawthorne studies (1920). In classical theories, the physical environment was perceived in its rigid perspective with no direct relation to workers.

In the case of Weber's formal bureaucracy, he had no explicit place for the physical environment but implicitly supported the use of status symbols.² On the other hand, in Taylor's theory, work-stations were a focus with respect to economy of motion. Economy of time and motion became the central criteria in the design of factories.³ Furthermore, the scientific management of Taylor with its emphasis on supervision, highlighted the visual accessibility of workers, whereas, Mooney and Reiley's concept of co-ordination stressed effective management resources wherein the physical environment was not of particular interest with respect to workers.

The above discussion, indicates that the physical environment was not a concern in classical theories where human needs were not of particular interest to

organisations, and the most important issue was to allow workers to operate at peak efficiency, regardless of their physical environment.

As a result, humanistic theories emerged, with two groups of ideas having particular relevance to workplaces. Different theorists have shaped humanistic theories namely: Maslow's (1943) need-hierarchy theory, Herzberg's (1959) two-factor theory, the human group theory of Homan (1950), Likert's (1957) organisational system theory, and development theory of Argyris (1957), and McGregor's (1957) X and Y theory.

These theories established a link to workplaces through their impact on worker's social aspects and workers interacting. For instance, Maslow suggests that each person has a hierarchy of needs including a need for social relationship. His theory pictured the physical environment as satisfying the basic need for shelter and security.⁴ Whereas, Herzberg, Homan's and Likert's theories have depicted the physical environment as one of the elements that contribute to job satisfaction, where physical proximity among workers is associated with interpersonal interaction. Moreover, hygienic needs was found to be associated with the work environment in Herzberg's two-factor theory, which showed that bad feelings of employees are correlated to working environmental conditions.⁵

In Homan's ideas, the cohesiveness of the groups of workers is associated with the physical environment, which creates opportunities for frequent interaction among them. The humanistic approach highlighted the human aspects of workers and initiated the link between workers and their workplace.

More emphasis was given in the system theories, for example in Trist, the socio-technical theory. Burns & Stalker's mechanistic & organic theory and

Woodward's industrial organisation theory were designed to demonstrate the interdependence of components of organisations.

In the case of the socio-technical system, the theory accentuates the importance of the fit between technology and the social structure of an organisation. It suggested a general principle-that technology (task characteristics, physical layout, equipment) needs to compliment relationships among workers and their jobs. The physical environment was typically arranged to define a group's area, or to identify pieces of equipment with groups or specific members of groups.⁶

The group work and teams were clearly emphasised in the organisational dynamic theories in which different theorists place a lot of weight on group work and knowledge as well as information exchange in workplaces. As an example, Lawrence & Lorsch (1967) in their differentiation and integration theory, state the need for information exchange among individuals and departments, and the physical environment is only one of the elements that can facilitate such integration.⁷

Peter & Waterman (1982) found that one of the characteristics that contribute to the success of an organisation is the productivity of people, in which workers are treated with respect and dignity.⁸ Kanter (1989) saw workplaces as a centre for social life.⁹

The emergence of learning organisations has led to an exploration of cohesiveness and strong interaction patterns of workers in workplaces. "People should learn to react as a whole with respect to the events compounded rather than to react to single manner only."¹⁰ The entire view of an organisation including people, structural levels and physical environment became the focal point of learning organisations, and to manage the organisational components is vital to accomplish produc-

tivity and efficiency of work.¹¹ Interaction of workers is necessary in learning organisations so that shared visions among workers can be achieved. The physical environment is considered as one of the tools used to promote interaction in this type of organisation.

The holistic context of communication is becoming important in learning organisations. Furthermore, the role of informal communication needs to move forward, which requires elements of the physical environment in workplaces to enhance it and contribute to its success.

Among the elements that contribute to the level of informal communication are the provisions of support services, quality of the facilities in terms of aesthetic value, and space layout, social or administrative settings.

This study focuses on the provision of support services through the elements of the physical environment and its effect on the level of informal communication in workplaces.

Moreover, as one of the contributions of this study an attempt has been made to tabulate and relate theories of organisation to the theories of communication to investigate the role of physical environment in workplaces. Table 4.1 illustrates these relations where, the early theory of Feudalism, organisations disregard the importance of physical environment and showed more concern on nepotism, favouritism and discrimination of workers.

Therefore, as the organisation and communication theories developed through time, the need for interpersonal interaction and elements affecting levels of informal communication through elements of physical environment has become much more recognised than previously.

Table 4.1 The role of the physical environment in theories of organisation and communication

Organisational theories	Emphasis on informal communication	The role of physical environment
Feudalism theory	Nepotism, favouritism, and discrimination	No interest with respect to human needs
Classical theory	Dehumanisation of workers	Symbols of office efficiency (economy & motion) supervision (visual acceptability)
Humanistic theory	Workers motivation, associated with interaction. Group norms and workers satisfaction value human needs of employees.	Physical environment associated with group cohesiveness and job satisfaction.
System theory	Emphasis on interaction, lateral communication between workers.	Interpersonal interaction associated with proximity and accessibility.
Organisational dynamic theory	Emphasis on team work, informal communication.	Enhancement of informal communication by means of physical environment.

Source: The researcher (1997).

4.3 The industrial workplace and spatial structure

The spatial arrangement of manufacturing buildings should take into consideration not only spaces for the manufacturing process and task oriented jobs but also the provision of supportive facilities that deal with the human needs of workers, such as rest areas, lounges, and recreational services. These are linked to worker's satisfaction and consequently, productivity.

Technological processes have traditionally exerted considerable influence on the spatial design of industrial workplaces. In early factories of the nineteenth century these considerations clearly dominated. With the emergence of Taylorism around the turn of the century, however, new elements were introduced into the planning of workplaces. Taylor was greatly concerned with improving industrial productivity, but he recognised that greater efficiency and productivity could not be attained

without giving workers some incentive to be more productive. He recognised that workers must receive more pay, in proportion to the profits and increased productivity, but enough to secure acceptance of his principles and methods. He also understood that the productive worker, in order to do his best, must be able to take breaks for rest and recreation and be provided with a decent physical working environment. The early Taylor inspired factories built by Henry Ford and, later by European industrialists, were designed to admit plenty of daylight and included generously dimensioned areas for the personnel.¹²

As the foregoing discussion illustrates it was clearly understood that the working environment determines employees output.

Almost all organisations needs loyal workers who will be willing to make an extra effort-work overtime - to make up the delays incurred. Such loyalty is naturally a function of how the organisation treats its employees and the working environment that it offers them.¹³

The early buildings reflect a conceptual linkage between the building and the activities that take place in it - the technology of production, but also some provision for workers' physical well-being. Looking back, we can see how the principles behind these early rational and modernist buildings have evolved in industrial buildings over the years. Many industries have deviated from the principles of the early years of this century in vital respects.¹⁴

The industrial halls that became common in Sweden in the 1960's and 70s, for example, departed from the notion that the shape of the room should bear some relation to the production process. Secondly, very little effort was made in these halls to ensure qualities in the work environment such as daylight, good lighting,

acceptable noise levels, climate control and good ventilation. It was observed a number of years ago how the versatility of these halls has been achieved at the expense of both production technology and the work environment. It was pointed out as well that there is some contradiction in the construction of the buildings. But still they display a greater degree of adaptability to new uses than many of the 'all-around' buildings of recent years.¹⁵

Industrial buildings are designed basically to house the equipment (both production and ancillary) required for the production of the goods produced by the organisation. Consequently, the designs should incorporate the spaces for the people to operate the equipment.¹⁶

Ireson, W.G. (1952), in his work "The Factory Planning and Plant Layout", stated that...

*"the manufacture of a product is the objective. Naturally, the product determines the equipment necessary for its own manufacture. The volume determines the number of units of each piece of equipment. The number of pieces of equipment and the auxiliary facilities fix the floor space needed immediately. The combination of the sequence of operations, the volume of weight and units, and the floor space requirements will largely determine the design of the building that houses the factory."*¹⁷

With regards to space requirements, workers have very definite spatial needs that must be considered in the design of any work environment.¹⁸

Usage of the built spaces in factories differ with each purpose. Peponis, J (1983) asserted that...

*"buildings are built for specific purposes and activities. In the case of factories accommodation for a group of people and the technology capable of producing a given range of products. Irrespective of the intentions of designers and users alike, buildings have other effects which are deeper and more pervasive. By subdividing and connecting spaces in particular ways, buildings construct a set of relationships between the users. In a most general way the arrangement of physical boundaries and the resulting pattern of space define social categories and their modes of communication."*¹⁹

The spatial organisation of a building denotes its function, whereas the building assumes connotations according to the socio-cultural background and experience of the person who interprets it.²⁰

The physical environment in offices and factories has generally been harnessed in the service of production. Recent managers and designers are concentrating on the ambient conditions and work flow of their offices, hoping to encourage production through individual efficiency and co-ordination of work. A similar statement of Diemer (1921) states that....

*"for psychological reasons it is desirable that the building presents a pleasing appearance rather than that of an ugly monster or prison."*²¹

Furthermore, many industrial buildings have incorporated architectural ornamentation, often at least partly in the belief that attractive buildings produced better work.²²

Peponis also describes the process of designing factories with respect to a building's core function, which is the manufacturing process, as follows:

*"Irrespective of the degree to which methods are systematically organised or simply collected together, there are certain themes which are persistent. One is the idea that design proceeds from an analysis of the products to an analysis of the operations that are required to produce them, to the determination of typical sequences of operations, to the establishment of the spatial requirements of operations, and to the form of the building."*²³

Furthermore, Peponis (1983) substantiates his observations by describing three major ways of design process by which the spatial structure of buildings and factories are built. First, by segregating and integrating spaces, buildings allow some differentiation of their users which corresponds to social distinction. Second, by defining choices for the transition from one space to another or by means of restricting such choices, buildings define relationships of control between the occupants of the various spaces. Third, by subdividing space, buildings modulate the degree of co-presence and the likelihood of encounter between their users and therefore influence their pattern of interaction. The general function which is entailed in the above is one of constituting particular 'spatial cultures' or ways in which people establish stable ways of being together. In the case of factories, the social functions of space reside in the accommodation of industrial organisations and the systems used for their management.²⁴

On the other hand, Reed (1974), has outlined the process of factory spatial structure designing in ten steps: (1) Analysis of the products to be produced. (2) Determination of the process required to manufacture the product. (3) Preparation of layout charts which show the flow of operations, the types of machines involved,

the systems of materials handling and the timing of each operation. (4) Determination of work stations, which takes into account, machine, operators and materials space requirements. (5) Analysis of storage area requirements. (6) Establishment of minimum aisle widths. (7) Establishment of office requirements. (8) Consideration of personnel facilities and services such as lockers, rest rooms, dining areas, etc. (9) Surveying of plant services requirements, and (10) Providing for future expansion.²⁵

With regard to the morphological patterns, space syntax is one of the theories that best illustrates spatial analysis in relation to the overall view of the space. Space syntax was the outcome of the social logic of space theory by Hillier & Hanson (1983) which aims to begin with architecture and to outline a new theory and method for investigation of the society's space relations but does not deal with provision of physical elements in workplaces.

4.4 Social patterns within industrial settings

People work together in complex organisations that have a variety of goals. Organisational goals influence people's behaviour, but people also bring their own goals and patterns of behaviour to organisations.²⁶ Several prominent theories suggest that various features of the job environment are causes of job satisfaction. These features include characteristics of jobs and job tasks and various aspects of the organisation. Indeed, many studies have supported the idea that certain job environment variables relate to job satisfaction.²⁷

An early example of the pattern of spatial structure was reported by Alexander (1965), 'A City Is Not A Tree.'²⁸ He was concerned with the nature of the spatial structure of cities. His dilemma was focused on describing natural cities in terms of a semi-lattice pattern and artificial cities in terms of a tree pattern. Alexander explained that people and especially architects, preferred old buildings and ancient squares and piazzas to new buildings and modern cities because of a failure to conceive certain spatial-social structures. He believed that natural cities have the semi-lattice pattern, while artificial cities have the pattern of a tree.

Similar discussion by Hillier & Hanson (1984) argued that Alexander's criticism of the formation of hierarchical spatial structure in design was too inclusive. In other words, Alexander's suggestion of conceiving spatial structure in a semi-lattice pattern would eliminate an important facet of space structure, *i.e.*, the hierarchical structure. A compromise is inevitable in this case. This is clearer once it is realised that society is the content of the spatial structure. When the social structure of people adopts the idea of hierarchy, their spatial pattern should also be hierarchical.²⁹

The problem of poor industrial workplaces in relation to workers exists all over the world and different industrial countries have experimented with the need to improve industrial workplaces with a social dimension, so that skilled workers can be attracted and can be productive and consequently organisational productivity can be achieved.

Hillier & Hanson (1984) asserted that....

"the problem of space and society could be conceptualised if we start to think of the material realm of physical space without social content and

an abstract realm of social relations without a spatial dimension. Such thinking would clarify that society can only have lawful relations to space if society already possesses a spatial dimension; At the same time space can only be lawfully related to society if it can carry those social dimensions."³⁰

Different writers have expressed the need to improve working conditions in factories not only with regard to production process spaces but also in terms of worker's needs as human beings.

Just as team work has become an important factor in an organisation's success, the work environment also plays an essential role in supporting an employee's creative work. Because in the future workers will be highly skilled and the organisation will offer fewer opportunities for advancement, employees will expect the work environment to be rewarding and if they are not stimulated or if their independence is threatened, they will go elsewhere.³¹

The Fordism movement is considered to be the dominant industrial model for the fast growing market economies in what are known now as traditional industries such as cars, ship building, transport equipment, steel, petrochemical, and consumer electrical goods. In other words, Fordism was mainly characterised as the mass production of standardised products, where team work and human labour relations were neglected.³²

The new era of Post-Fordism has been characterised by increasingly flexible labour processes and markets; programmable automated production; heightened geographical mobility; rapid shifts in patterns of consumption, and privatisation, deregulation and reduction in state economic activity.³³

In the same way that the new production methods of Fordism were accompanied by visions of a mass consumerist lifestyle, the Post-Fordist economy presupposes a social vision: a rapid turnover of consumption catering to specialised tastes with diverse products.³⁴

Modern management literature is studded with phrases to the effect that a company's personnel is its most valuable asset.³⁵ One does not necessarily need to have 'industrial experience' to understand the most essential needs and requirements of the industrial worker; good health, comfort, recognition, the opportunity to create and grow in a spirit of fraternity and security, are all key words for that quality of life we all seek.³⁶

Traditionally, manufacturing business have been organised 'in series' with functions such as engineering, manufacturing, and marketing as successive steps. These days, that system is often complemented by a parallel team organisation (Proctor & Gamble's product management teams is an example), which brings various functions together from the inception of a new product or process project. If manufacturing is a system, however, every decision in the manufacturing business becomes a manufacturing decision. Every decision should meet manufacturing's requirements and needs and in turn should exploit the strengths and capabilities of a company's particular manufacturing system.³⁷

The informal communication in manufacturing is an important event among workers. Furthermore, the physical environment contributes significantly to the enhancement or diminishment of informal communication. Two studies by sociologists at factories found that employees talked informally with nearby neighbours when they could. Walker & Guest (1952) found that at one of the automobile plants,

almost one-half of a sample of 179 workers said they talked with their neighbours at least once every five minutes, despite the loud background noise; only about 10% said they talked with neighbours fewer than three times per day.³⁸

We can say however, that besides a friendly environment, perhaps the most important part of the workplace for the individual comprises his or her work station. The only generalisation about work stations however, is that most factory workers spend most of their time seated before work surfaces or machines.

Alexander (1995) argued that the satisfaction of occupants, in line with the organisation's strategy of empowerment, may depend largely on the levels of perceived control over their physical workplace and internal environment.³⁹

In support of this statement, Wiggins (1997), from his report, argued that:

*"British Airways seeks to be the premier provider of property services to the aviation industry where service levels exceed customer expectations. The aim is to do this by improving the working environment, supporting the operation and getting the maximum benefit from the assets."*⁴⁰

Similar gestures towards the physical workplace and internal environment were presented earlier in the work of Peponis (1983). He pointed out the 'critical event in factory design' in the case of Kalmar assembly plant of Volvo Motors. The Kalmar plant demonstrates an excellent example of plan layout and factory building design guidance. The intentions behind the design were summed up by Gyllenhamman, Volvo Motor's president, who endeavoured to arrange car production in a manner that made it easy for the employees to find meaning and satisfaction in their work. It was obtained through direct communications and carrying out job-rotation. The management made them aware of their responsibility towards work.⁴¹

The SAS building in Frosunda in northern Stockholm is another example of a large building that explores a fifth level of social interaction. Here the different office buildings with service facilities for 1,400 employees are located along a glassed-in street which contains public and semi-public activities; a reception, shops, travel agency, gymnasium, swimming pool, cafeterias and restaurants. Meeting rooms on balconies are located on shelves in space. Street murmur, the occasional invited musician, and the street life (especially during lunch hours) are a stimulating complement to more internal daily company work.⁴²

While factories and offices have changed over the past century, they have always had to accommodate people who handle machinery or information.⁴³ Regardless of the level of technology, industrialists are now convinced that skilful, creative and committed employees will be indispensable in factories of the future. When designing workplaces, we must not lose sight of the fact that work is performed on the basis of human capabilities and requirements. Thus, the workplace should be placed in a sphere of knowledge which deals with human factors.⁴⁴

There has always been a relationship between the chosen technology, how work is organised, and building design. Sometimes the guiding idea has been that machinery needs appropriate indoor space. With the socio-technical approach the entire human being has finally been taken into account. This recognition means that the workplaces have to satisfy the whole person's needs; not only his physical needs, but also his sensual need for beauty, and his social and psychological need for identity, understanding, contact, self-esteem and freedom. With this, the built environment assumes new meanings in the production system, while it retains the meanings and function it previously had.⁴⁵

Today's organisations believe that the quality of the workplace is an important aspect of cultural change and can lead to upgraded productivity as well as provide a competitive edge.⁴⁶ As evident from the above, the social dimension has lately become more important in office and manufacturing buildings and in order to organise factory space according to social intentions, architects and engineers must not only possess a repertoire of stereo type solutions but also an understanding of the principles of the social functions of space.

4.5 Information technology and social behaviour in the industrial workplace

Information technology has fundamentally changed methods of gathering, observing and analysing information; the creation and evaluation of ideas; and the resultant decision for action. The typical organisation of the future will be knowledge based, composed of specialists who direct and discipline their own performance through organised feedback from customers.⁴⁷

The introduction of telecommunication networks have affected the social behaviour in workplaces, especially the office environment. Even though this study is concerned with manufacturing workplaces where it is expected less use of computers and telecommunication channels between workers will be made, it is vital to outline the instrumentality of information technology in respect to social interaction and informal communication among workers. This is especially true when considering that the future trend of industries is to maximise the automation process and the use of information technology in manufacturing workplaces.

Information technology has played a dramatic role in changing organisational structure and business activity. It has been noted that basic developments in science and technology have revolutionised computer and telecommunications hardware. The trend is expected to continue to maintain a constant pressure for change on organisations and business activity.⁴⁸ Information technology enables the business to target market niches much more easily, to adapt products and services to consumer needs, and to forecast demand and control stock more efficiently.⁴⁹

Further, workers at the production level of an organisation have become an important factor in information transmission within the organisation's structure. It has been noted that the role of management in problem solving will become more important with increased responsibility for the fewer remaining managers at lower levels. Shop floor workers, for example, may be made responsible for more tasks at larger volumes of production; salesmen may have more responsibility for delivery and customer commitment; middle management may take on responsibility for more complex problems.⁵⁰

The post-Fordist movement created new patterns of work within organisation structure, teamwork became an important factor in organisations, therefore, a high level of lateral communication among workers became a vital process in work accomplishment. Workers in information organisations have to be more highly skilled and better trained, they are specialist problem solvers working in teams or groups rather than de-skilled workers performing standardised tasks. Work may be done by task oriented teams from various departments supported by distributed information systems.⁵¹ The organisational structures of Post-Fordist enterprises are less hierarchical and more dependent on dispersed information. Unlike Fordist

production systems which presupposed a clear hierarchy of skills divided among a privileged managerial elite and a de-skilled labour force at the point of production, the Post-Fordist organisation makes use of a flatter organisational profiles which encourage a more widespread distribution of knowledge and skills.⁵²

British Telecommunications plc (BT) is trying to use a new physical and Intelligent Telecommunication environment to radically change organisation behaviour. BT has embarked on major challenge for a major change. In a planned programme the objective is to take a holistic view of the corporate technology and property strategies. The idea is to give staff much greater flexibility in where, when and how they work. In this way they are expected to increase productivity by measures of responsiveness, innovation and quality of service.⁵³

Information moves and its effects are everywhere, pervasive; almost all businesses have tried to organise themselves around information. A good example of the failure of management information tactics is that of Massey Ferguson, the world's farm equipment and diesel manufacturer with its complex business in organisational terms, with headquarters in Canada and the production site in Europe. The director implemented 14 layers of management (identified to be too complex) only to discover a great truth that many levels of management in fact manage nothing, they make no decisions at all. Today the management layers have dropped to 6 and the number is still coming down.⁵⁴

The reason why large organisations will have to become information-based is due to systematised innovation and entrepreneurship and finally the requirement to come to terms with information technology.⁵⁵ Business will have to learn that they must build their communication systems on information up rather than information

down. Information becomes communication only if the recipient understands and accepts it.⁵⁶

Organisations require more than a fairly drastic change in the factory's physical structure. In the factory of 1999, sectors and departments will have to think through what information they owe to whom and what information they need from whom. A good deal of this information will flow sideways and across department lines not upstairs. The factory of 1999 will be an information network, consequently, all the managers in a plant will have to know and understand the entire process.⁵⁷

While factories have changed over the past century, they have always had to accommodate people who handle machinery or information. The evolution of work places reflects change attributable to the development of technology and organisations, as well as continuity in the relationships between workers and workplaces.⁵⁸

The use of computers in today's manufacturing offices is the main issue that causes changes in the way work is performed. Thomas Morgan (1990), has investigated the link between social patterns and computer media in which he found that face-to-face informal communication can be achieved using the computer as a media.⁵⁹ Thus, a certain factor which is detrimental to health should also be considered. It has been found that the fatigue caused by visual display units (VDUs) in most manufacturing firms is a representation of stress. Radiation, visual fatigue, and eye strain has become a dominant problem in today's workplaces.⁶⁰

Moreover, information technology media such as electronic bulletin boards could be used to enhance informal communication.⁶¹ It is where people are stimulated to gather and socially interact with each other and it develops the importance of elements of the physical environment.

4.6 Elements of the physical environment in the industrial workplace

The job environment can affect job performance in many ways. The environment can have a positive or negative influence on employee motivation, leading to an increase or decrease in employee efforts. Likewise the environment can be structured to facilitate performance by making it easier for individuals to accomplish their jobs, or it can contain constraints that interfere with performance.⁶²

Satisfaction with the physical environment is a component of job performance and the physical environment is a potential source of support for the performance of specific jobs. In turn, job satisfaction and individual performance are components of the effectiveness of the organisation.⁶³

Cairns & Cassels (1997), from their study *Re-imagining the Workplace*, argued that....

“the last decade has seen a concentration upon business process re-engineering for many organisations. They seek to improve competitiveness by finding new ways of doing things within different structures and organisational cultures. The process provides a focus for improved competitiveness in the global marketplace as well as internally. In such a situation there is an obvious need for re-appraisal of physical setting within which the business activities are accommodated.”⁶⁴

At around the turn of the century, managers and designers concentrated on ambient conditions and work flow, hoping to encourage production through individual efficiency and co-ordination of work. Later managers saw that productivity called for effective communication, and the physical environment become a tool for the facilitation of communication.⁶⁵

Today's factories are different from those of the early 1900's in respect of their physical conditions due to different factors such as legal developments, employment unions, educated workers, in addition to the new standards of work conditions for worker's health and safety. Current conditions in factories in the case of United States vary, but since 1970 they have been regulated by Federal laws.⁶⁶

The basic strategies of empirical research used by industrial, human, environmental psychologists in the study of office and factory workplaces are: field experiment, laboratory experiments, field studies and surveys. The strategies differ but all involve the systematic assessment of behaviour or attitudes in relationship to variations in the physical environment.⁶⁷

Several empirical studies have been conducted in office and factory workplaces to investigate the relationships between physical elements and productivity of workers. Even though they did not show a clear relationship they led to the tendency to see a link between workplaces and physical environment issues. One of the earliest studies that explored the influence of the physical environment on the performance of workers was the Hawthorne studies in 1924.⁶⁸

However, the conclusion of the Hawthorne studies regarding the relationship of environmental lighting to productivity was not supported in the sense that there are other factors that might have affected the results such as the procedure of measurement used and management styles.⁶⁹ Morgan undertook a laboratory study investigating the relationship between noise and productivity. It is also difficult to draw a clear conclusion due to the artificiality and brief duration of the study.⁷⁰ A similar investigation was made by Vernor (1919), but focusing on the relationship of

temperature to productivity in an English tin-plate factory. It was found that production declined as the temperature rose.⁷¹

The Volvo factory in Kalmar in the Southeast of Sweden is considered as a unique example of an ideal industrial workplace. The Kalmar factory has long been considered the first step toward better conditions in industrial work.⁷² The social dimension was carefully studied in the Kalmar factory, considering the teamwork of employees and its social impact. Working in teams of 15-20 improves social contacts and gives the workers a better overview of their work.⁷³ The social aspects were enhanced by the upgrade of workplace conditions which promote team work and group interaction.

In an office workplace, one of the major challenges to a change of telecommunications strategies was embarked on The Workstyle 2000 Programme of the British Telecommunication. It aimed to use changes to the physical and technological environment and their management as catalysts for cultural change. The project has a broad scope, but one of the key elements in the programme is the physical office environment and world class service provision to support the core business.⁷⁴

The role of the physical environment in enhancing productivity and effectiveness of organisations is still at the beginning stages with respect to research.

Sundstrom (1986) argued that..

“the physical environment may have a corresponding role, perhaps as part of a socio-technical system, which defines the work-units of an organisation as well as their relationships. However, this role is only beginning to emerge.”⁷⁵

Moreover, Sundstrom (1986) noted that...

*"the current status of empirical research on offices and factories leaves much to be desired. It over emphasises laboratory experiments and under emphasise field research. For many issues, evidence is scant."*⁷⁶

4.7 Supportive facilities in industrial workplaces

Apart from the basic function of accommodating the equipment and the workers, the factory buildings serve certain secondary purposes. These include provision of office space for the organisation's administrative and marketing areas; provision of the human resource support services is essential too, such as dining rooms, closets, toilets, lounges, coffee rooms, in addition to storage facilities for raw materials and finished goods, etc.; In the case of mass-production factories, there is the need for a tool shop, paint shops, dispensaries, quality control laboratories, switch rooms, control rooms, maintenance workshops. Usually, factory buildings are categorised into four distinct areas, namely, the production area, the production support area, the administrative area and the human resources support area.⁷⁷

Workers are human beings, therefore, psychological issues should be considered within workplaces. Workers will expect an environment that is physiologically supportive and visually pleasing, one that enables them to feel comfortable and stimulated when working for very long hours with people they may not be familiar with.⁷⁸

Moreover, it has been realised at the same time that a sense of identity is stimulating for the individual, and being able to create a personal touch in their place of work is a vital aspect contributing to workers' satisfaction and well-being.⁷⁹ In

addition, supportive facilities are a vital part of the physical environment of the work place. Although the work-station comprises the immediate physical environment for most office or factory workers, these employees use other parts of the building as well, such as lounges, cafeterias, lunch rooms, vending rooms, exercise rooms, rest rooms, etc..⁸⁰

In office and factory workplaces several research studies have been conducted mainly with respect to work stations. They have particularly dealt with their components, not the work station as a whole, and have usually sought to establish guidelines for design.⁸¹

Enhancing communications and improving corporate communications is the key to organisations success now and into the future. Understanding is needed of how the physical environment and support services impact on levels of personal interaction and how better communications can ultimately support effectiveness.⁸²

It has been noted by Sundstrom (1986) that the psychological impact of supportive facilities remains essentially unexamined, at least within the context of offices and factories. One possible explanation for the lack of psychological research is that specialised supportive facilities are seen as the province of technical experts, such as architects and industrial engineers. Another possibility is that such areas are largely taken for granted and ignored or treated as incidental. For whatever reason, supportive facilities constitute a blind spot in research on office and factories.⁸³

Therefore, it is an aim of this study to examine industrial workplace supportive facilities, particularly in gathering places.

4.8 Gathering places and social behaviour in factory buildings

Almost all industrial activities happen through some form of co-operation and have therefore some element of interpersonal relationship. Even those who have little need for personal interaction require interdependence and a sense of community around a common activity as factors for a positive working environment, not only between co-workers, but throughout the whole of the concern.⁸⁴

As Sims (1997) argued that...

*".. in addition to promoting interaction within the team itself, most team-orientated environments are also designed to promote cross-team informal interaction. This is usually accomplished through common areas where a number of communication magnets are grouped to bring the people together. Usually this includes clustering things like break areas with food and drink, together with common activity generators like mail boxes and copy services. These areas need to be managed to promote communication."*⁸⁵

With regard to gathering spaces, Cunninghamman (1997) suggests that accessible and convenient spaces are required, sympathetic to the characteristics of individual staff members. These are categorised as follows: A central location, or one which is accessible and performs functions of circulation, linking different areas of the premises and organisational system; the place should have attributes that provide some comfort, making it a pleasant place to stay or pause. Such items may be coffee or vending machines, tables, chairs and attractive decoration; and people must be able to form groups in this area without blocking access or circulation of others. There may often be an advantage in such areas being out of audible reach of working

areas, providing less disturbance to surrounding workers and also privacy to the persons in conversation.⁸⁶

In factory buildings, one of the supportive facilities that can be found is gathering places such as lounge spaces which include refreshment facilities, where informal communication between workers can flourish at least to the extent that the monotony of work can be broken. Jasinski (1956) argued that factory work may make informal conversation highly desirable to employees to break the monotony.⁸⁷

Gathering places are important in office and factory buildings, since people converse in them more readily than in their workplaces. Sundstrom (1986) stated that,

*“people in offices and factories often converse in locations out-side their work spaces, such corridors, cafeterias, mail room, supply room, locker room and areas around water fountains, bulletin boards, coffee pots, computer terminals or vending machines.”*⁸⁸

People usually tend to converse in order to socialise, in the lack of gathering places, workers seem to practice this anywhere they can. Moreover, Sundstrom (1986) argued that, in the absence of designated places for gathering, employees seem to improvise.⁸⁹

The physical characteristics of a gathering place are vital to accomplish its function. Fred Steel (1973) proposed some of these characteristics. One is that it be central, that is, that people would naturally pass through it on their way to other places. A second is that there be places to sit or come to rest comfortably. Third, people need to be able to stop there, and converse or watch others, without blocking the flow of vehicular or foot traffic by their stopping. As observed, a bulletin board in

a busy narrow hallway is almost useless, since no one can stop there long enough to read it or chat with others about the notices without clogging up the whole hallway.⁹⁰

However, most of the empirical studies on gathering places was done in an office work setting or in an educational setting.

Two studies were based in educational settings and four examples of personal observation were in office buildings. The first study was conducted in an educational setting by the Building Performance Research Unit in Britain (1970) as part of an evaluation of a school building at St. Michael's Academy.⁹¹ The sample study included 20 teachers whose opinions were surveyed and habits of the usage of space were observed. Despite the existence of a main staff room, the 20 teachers used different gathering places and during the period of one year, they did not see each other due to the fact that the intended gathering space for teachers, *i.e.*, main staff room was not used because teachers thought it was too small and far from their classrooms and breaks were short. Instead these teachers adapted smaller rooms to suit their purposes including a store room and supply room.⁹²

Another example of the benefits of gathering places in a hospital setting was researched by Lentz (1950) who stated that, technicians and nurses aids relaxed together with the business staff and exchanged hospital gossip. The office workers commented on this, saying that they felt more a part of the hospital since they got to know the story behind the patients with whom they dealt. It made their work more meaningful.⁹³

The above examples illustrate how workers from different department integrate and socialise where it might not otherwise be possible due to the nature of their work distance.

An example of personal observation was related to Sundstrom (1986) in an educational setting at the University of Tennessee. The faculty of the department of psychology at the university of Tennessee had offices in three buildings, and those in different buildings rarely saw each other. When the department prepared to move into one office building, administrators decided to use the building to encourage interaction. All of the faculty mail boxes were located in a single large room, along with a coffee pot, refrigerator, comfortable chairs, a couch, and tables. No systematic observation were made, but contact seemed to increase among the professors. They often sat in the lounge to chat over coffee as they collected their mail. The lounge also became a gathering place for graduate students and secretaries, whose mail boxes were also located there, which apparently encouraged contacts among people from different parts of the organisation.⁹⁴

The second empirical study was in an educational setting and recorded by Campbell and Campbell (1988). It focused on the link between elements of the physical environment and informal social interaction in departmental lounges. A combination of methods consisting of questionnaires, interviews and systematic direct observation were used. The main hypothesis was that there would be a relationship between the physical characteristics of the lounge settings and the type of use. The results indicated that lounges with more of the desirable physical characteristics were more heavily used.⁹⁵

Campbell & Campbell (1988) described the following “model of informal communication in organisation.”⁹⁶

Figure 4.1 A model of informal communication in Organisation.



Source: *A new look at informal communication - The role of physical environment* by Campbell & Campbell (1988).

Moreover, the total number of design features was positively correlated with a variety of observed activities and with the number of occupants observed engaging in some form of informal communication. Specifically, it was found that lounge settings with more of the supportive physical features tended to be more highly used than settings with relatively few of these features.⁹⁷

The results of Campbell & Campbell (1988) are congruent with the suggestion made by Sundstrom (1986) that informal communication will increase with the accessibility and proximity of employees.⁹⁸

Furthermore, Campbell & Campbell (1988) argued that greater use of spaces is associated with the following characteristics: things that attract people, things that hold people, and things that support informal communication.⁹⁹

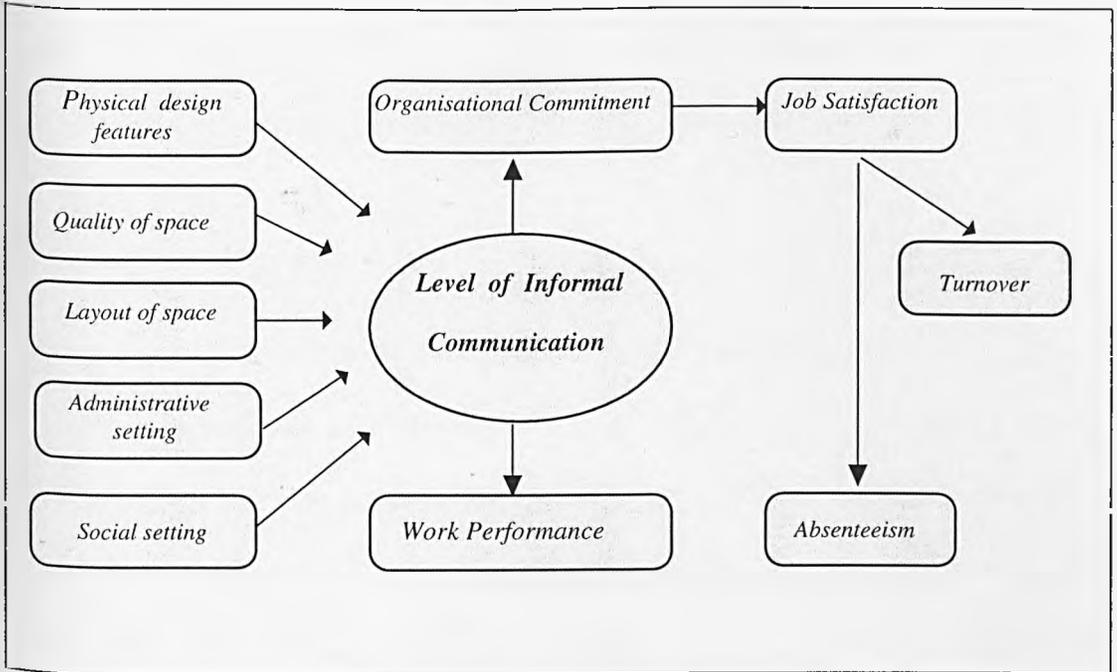
Campbell & Campbell (1988) concluded that further research was needed in other workplaces in order to generalise findings. They stated. It must be noted that these studies were conducted within university settings. The results may be generalised to research and development organisations with relatively little trepidation. However, to generalise further would be hazardous without similar research in traditional business organisations.¹⁰⁰

The conclusion made by Campbell & Campbell (1988) of the need for further research in the link between environmental supports and level of informal communication coincides with Sundstrom's (1986) question, What environmental conditions are conducive to the development of gathering places in offices or factory?¹⁰¹

An attempt of this study is to replicate Campbell & Campbell's (1988) study with similar methods of research, *i.e.*, direct observation, questionnaires and interviews but in another type of setting other than educational. This will be in a manufacturing setting and in a different cultural background, *i.e.*, in Saudi Arabia, acclaimed to be one of the fastest developing countries in the Middle East, specifically in manufacturing sectors.¹⁰²

Furthermore, as a contribution of this study, Campbell & Campbell's (1988) model of informal communication in organisation is manipulated to a new format illustrating other factors that affect level of informal communication in workplaces.

Figure 4.2 Effects and influences on informal communication in organisation



Source: *The Researcher* (1997).

For the purpose of this study, only one link will be examined, that is, the relationship between the provision of physical design features and levels of informal communication in manufacturing setting. There are, however, other effects: quality of space, layout of space, administrative setting, and social setting which need further researcher. (Figure 4.2).

The next chapter will deal with Saudi Arabia's national development plans in order to highlight the manufacturing sector that the Saudi government has paid so much attention to.

4.9 Summary

The foregoing discussion strengthens the argument that informal communication is determined by several aspects in the workplace, one of which is the elements of the physical environment.

It has been found that gathering places in industrial workplaces perform a vital role in breaking the monotony and fatigue of the workers leading eventually to greater job satisfaction of workers.

A model has been constructed in this chapter in order to establish the link between organisational theories, communication theories, and physical environment.

As illustrated, the field of physical environment research in workplaces of factory buildings is still in the preliminary phase and evidence is scant. Most of the empirical studies of the role of the physical environment focused on educational organisations and left office and industrial workplaces with much to investigate. The noted and most recent study in this regard is Campbell & Campbell's (1988) study in an education setting. The study found that physical elements in university lounges correlated to the degree and variety of lounge use. Campbell and Campbell's (1988) findings *per se* cannot be generalised since it is limited to one type of organisation, *i.e.*, education in a Western cultural setting. Hence, this study will continue from where Campbell & Campbell (1988) study ceased. It will investigate the role of the physical environment on the level of informal communication within a manufacturing workplace setting in a different cultural background, *i.e.*, Saudi Arabia, which is considered as one of the fastest developing country among the Arabian Gulf coun-

tries in the Middle East. Saudi Arabia is diversifying its national income from oil dependence and is concentrating on the private manufacturing sectors.

The succeeding chapter will focus on Saudi Arabia's development plans and their significance to the manufacturing sector.

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CHAPTER - 5

THE FIVE DEVELOPMENT PLANS AND INDUSTRIAL ORGANISATIONS IN SAUDI ARABIA

5.1 Overview

This chapter will deal with Saudi Arabia with regard to different perspectives, and attempts to explore the role of the manufacturing sector in Saudi national economy, as well as the importance of workers in the manufacturing sector of Saudi Arabia.

Moreover, this chapter will deal with a brief overview of Saudi Arabia's five year development plans and the objectives of each plan will be highlighted. There will be a further discussion of the Sixth development plan (1995-2000) with its strong emphasis on technical skills of the Saudi work force and Saudiisation issues.

The labour market in Saudi Arabia will be discussed in detail to show the need for better working conditions of the workers in particular. Fourthly, Saudiisation issues in the current development plan and future prospects of young Saudi graduates will be looked at.

The fifth section will deal with the privatisation of public industry since the Saudi government places a lot of emphasis on the role of the private sector in supporting the national economy. The last section will be an overview of Saudi industrial organisations and the different labour regulations of Saudi industry will be illustrated.

5.2 Saudi Arabia's five year development plans

Saudi Arabia is a monarchy headed by King Fahd Bin Abdul Aziz, Custodian of the Two Holy Mosques and Head of State. It extends over an area of approximately 2,125 million square kilometres, about one-fourth the size of the United States. The

country is bordered by the Red Sea and the Gulf of Aqaba on the west, by the Republic of Yemen and the Sultanate of Oman to the south, the Arabian Gulf, the United Arab Emirates and Qatar to the east, and Jordan, Iraq and Kuwait to the north.¹

From the point of view of cultural heritage, the Kingdom is bordered to the north by countries with ancient civilisations - such as Syria and Iraq and to the south by Yemen and Oman. Since ancient times, these centres of civilisation were connected by caravans. The people of Syria were engaged in trades in the same manner as the people in the south of the Peninsula who carried trade, along with the creed of Islam, to Southeast Asia and Southeast Africa. There were no natural barriers to obstruct direct ties between the Kingdom and its surrounding countries. The people of Saudi Arabia have easy access to the Mediterranean through the Red Sea.²

More than half of the total area of Saudi Arabia is desert. Saudi Arabia's population according to the census of 1992 was 16.9 million and had increased to 17.8 million by mid-1994, with an annual growth rate of 3.2 percent. It was forecasted that by the year 2000 the population would have increased to 23.1 million.³

The growth of Saudi Arabia started in 1960, Saudi towns were still no more than desert communities, with people living in mud-built castles, surrounded by mud and brick buildings and huge mud walls. Roads were non-existent between the towns. Principal towns like Riyadh, Jeddah and Dammam were not more than a few hundred meters in diameter and were surrounded by a huge mud wall several meters high.⁴

Today, after 37 years of growth, Saudi Arabia's cities have witnessed exceptional rates of growth. Infrastructure facilities were introduced and the desert towns

with their old mud buildings were transformed into larger modern and cosmopolitan cities, mushrooming with skyscrapers and grand commercial centres. Public utility projects in Saudi towns and village have cost SR 266 billion (\$60 billion) in the last four development plans.⁵

Beginning in the 1970s, Saudi Arabia was able to rely on extensive oil revenues, which enabled industries to move quickly along the path of development in terms of substantial infrastructure creation and human-resource development. The growing revenues from oil became the operating mechanisms that provided goods and services to the citizens and built the much needed ports, roads, power plants, communication systems, schools and hospitals.⁶

The government's desire to provide improved standard of living for its citizens has led the Saudi government to set-up a time frame that will shift Saudi Arabia's traditional, cultural dependency significantly onto the private sector.

The First of the five-year development plan covered the years 1970-1975. The medium term objectives of the First Development Plan (1390-1395 A.H.) were to continue the steady expansion of the economy, especially the infrastructure and to improve government services and the management of the economy through new administrative programs. The plan also gave great emphasis to the long term objective of developing the nation's human resources, through extensive investment in education and training.⁷

Among the primary objectives of the First plan were:

1. Increasing the rate of growth of gross domestic product (GDP);
2. Developing human resources so that the several elements of society would be able to contribute more effectively to production and participate fully

in the process of development, and;

3. Diversifying sources of national income and reducing dependence on oil through increasing the share of other productive sectors in gross domestic products.⁸

From year 1975-1980, the Second Development Plan (1395-1400 A.H.) was introduced with few constraints compared to the initial plan. In contrast to the First Plan, the Second plan was formulated under conditions of financial independence provided by oil revenues, which gave full cover for both government expenditure and imports.⁹

The Second development plan, provided for further advance toward the social and economic goals listed as follows:

1. To maintain the religious and moral values of Islam;
2. To assure the internal security of the Kingdom;
3. To maintain a high rate of economic growth by developing resources, maximising earnings from oil over the long-term and conserving depletable resources;
4. To reduce economic dependence on the export of crude oil;
5. To develop human resources by education, training, and raising standard of health;
6. To increase the well-being of all groups within the society and foster social stability under circumstances of rapid social change; and
7. To develop the physical infrastructure to support the achievement of the above goals.¹⁰

Subsequent to strong economic expansion during the Second Plan period, the Third Development Plan (1400-1405 A.H.) (1980-1985) was prepared at a time when

Subsequent to strong economic expansion during the Second Plan period, the Third Development Plan (*1400-1405 A.H.*) (*1980-1985*) was prepared at a time when the need for consolidation was evident. As a result of high growth in the non-oil sectors, averaging 15 percent annually, the Kingdom emerged from the Second Plan with a substantial capacity for converting its financial resources into real domestic assets, thereby allowing for further expansion in more complex directions.¹¹

The major objectives of the Third development plan favoured qualitative changes and were as follows:

1. To promote structural change in the economy through emphasis on resource development and growth in the producing sectors;
2. To increase economic and administrative efficiency, and
3. To increase participation in the development process, thereby raising the overall level of social welfare.¹²

By the time Third Plan was ended, most of the objectives had been substantially met. The infrastructure was in place and citizens were in school, receiving medical care and generally living in a material world substantially improved over that of their fathers and mothers.¹³

The main objectives of the Fourth Development Plan (*1405-1410 A.H.*) (*1985-1990*) were to continue the strategy of the Third plan. The economy continued to undergo structural changes, emphasising the use of human resources and the development of the producing sectors.¹⁴

The objectives represent an overall encompassing framework for structural change, following eleven main objectives:

1. To safeguard Islamic values, duly observing, disseminating and confirming

Allah's Sharia (God's Divine Law);

2. To defend the Faith and the Nation; and to uphold security and social stability;
3. To form productive citizen-workers by providing them with education and health services, ensuring their livelihood, and rewarding them on the basis of their work;
4. To develop human resources, thus ensuring a constant supply of manpower, and to upgrade and improve its efficiency to serve all sectors;
5. To raise cultural standards to keep pace with the Kingdom's development;
6. To reduce dependence on the production and export of crude oil as the main source of national income;
7. To continue with real structural changes in the Kingdom's economy to produce a diversified economic base with due emphasis on industry;
8. To develop mineral resources and to encourage discovery and utilisation thereof;
9. To concentrate on qualitative development through improving the performance of the utilities and facilities already established during the three previous Plan periods;
10. To complete the infrastructural projects necessary to achieve overall development;
11. To achieve economic and social integration between the Arab Gulf Cooperation Council (GCC) countries. ¹⁵

The Fifth Development Plan (1410-1415 A.H.) (1990-1995) emphasised the importance of private sector expansion and the need to improve Saudi Arabia's competitive position in world markets.¹⁶

The invasion of Kuwait and the subsequent outbreak of the Gulf war posed enormous organisational and financial challenges to the Saudi economy in the early years of the Fifth Plan. The chaos caused by the outbreak resulted in a decline in government-induced demand had a serious effect on economic growth at the end of the Fifth Plan period, although its effects were limited by the private sector's ability to adapt to lower government spending. However, demand and investment activity has been firmly established despite the negative impacts of the Gulf war.¹⁷

The transition from a primarily budget driven economy to an economic structure in which demand and investment activity was firmly established contributed to the major objectives of the Fifth Plan as follows:

1. To develop human resources, thus ensuring a constant supply of manpower upgrading its quality and improving its efficiency to meet the requirements of the national economy;
2. To reduce dependence on the production and export of crude oil as the main source of the national income;
3. To continue the restructuring of the Kingdom's economy and the diversification of the economic base, with due emphasis on industry;
4. To concentrate on the qualitative development of existing utilities and facilities by improving their level of performance;
5. To encourage further private sector participation in socio-economic development.¹⁸

Throughout these years, the steady and systematic progress in long term economic diversification into manufacturing, agriculture, and financial services, in education and manpower development, and in the expansion of health and social services, continued at a fast pace.¹⁹

The economic and social development of Saudi Arabia has proceeded at a rate unmatched almost anywhere in the world. The economy has grown to be ranked among the 20 largest economies in the world. A modern economic infrastructure has been established and the economy is steadily diversifying away from dependence on oil exports. As a result, the country has been transformed within twenty years, but throughout the development process, firm adherence to Islamic values and cultural traditions has been a constant guiding principle, so that a high degree of social and cultural stability has been maintained.²⁰

5.3 Objectives of Saudi Arabia's Sixth Development Plan (1995-2000)

For the past 25 years the economic development of Saudi Arabia has been broadly governed by five year economic plans. The first five plans emphasised the development of the Kingdom's infrastructure with the plans focusing on human resources and private sector development. The Sixth Plan in 1995 calls for further development of the technical skills of the Saudi population. It gives strong emphasis to the private sector's role in the economy through increasing diversification of the industrial base and agriculture.²¹ The main themes of the Sixth Plan are to increase the rate of Saudi working nationals (Saudiisation), by whom non-Saudis are being

replaced, the opening up of more opportunities for private sector investment and the achievement of greater economic efficiency in the government and private sectors as well.²²

To obtain maximum results, the Sixth Plan has placed an emphasis on improving economic efficiency by raising productivity through training; by using the latest technology and other measures aimed at accelerating the Saudiisation of the work force and by implementing programs and management techniques for the fuller utilisation of existing infrastructure capacity.²³

In order to assist in achieving the objectives of economic development and diversification, the government has created many major institutions like the Royal Commission for Jubail and Yanbu, whose mission is to develop two large new industrial cities.²⁴ With many large projects already under way, the government has concentrated on the completion of those infrastructural projects that provide the foundation for a more diversified economy. The volatility of oil revenues re-affirmed the need for the private sector to expand and for the economy to become less dependent on government activity in the oil sector.

The Sixth development plan represents an important phase in the continuing economic and social development of Saudi Arabia. Through the implementation of the first five plans, the government realised tremendous achievements in many different sectors of the economy. Much still remains to be accomplished, however, as development is a continuing process. For this purpose the objectives of the Sixth plan emerge changing from one plan to another in accordance with the prevailing economic, social and political conditions. Below is the outline of the objectives of the Sixth development plan.:

- 1) To safeguard Islamic values by duly observing, disseminating and confirming Allah's Sharia (God's Divine Law);
- 2) To defend the Faith and the nation and to uphold the security and social stability of the Kingdom;
- 3) To form the productive national citizen through providing him with the appropriate means and sources of income, and ascertaining his reward on the basis of his work;
- 4) To develop human resources and continually ensure an increasing supply of manpower, upgrading its efficiency and sufficiency to meet the requirements of the national economy, and replacing non-Saudi manpower with suitably qualified Saudis;
- 5) To achieve balanced growth throughout all regions of the Kingdom;
- 6) To continue encouraging private sector participation in socio-economic development;
- 7) To reduce dependence on the production and export of crude oil as the main source of national income;
- 8) To continue restructuring the Kingdom's economy through continuing diversification of the economic base, particularly through laying more emphasis on industry and agriculture;
- 9) To develop mineral resources and to encourage discovery and utilisation thereof;
- 10) To concentrate on qualitative development of already existing utilities and facilities by improving their level of performance;
- 11) To complete infrastructure projects necessary to achieve overall development;

- 12) To promote scientific activity and to raise cultural and informational standards to keep pace with the Kingdom's development, and lastly
- 13) To achieve economic and social integration among the Gulf Cooperation Council (GCC) countries, and to support economic co-operation with Arab, Islamic and other friendly countries."²⁵

5.4 The labour market in Saudi Arabia

The Kingdom's rapid expansion in education and training systems in successive development plans reflects the importance of the basic objectives therein.

As the number of Saudi graduates from education and training systems continues to grow, the Sixth Plan renews the emphasis on replacing non-Saudis by Saudis. It requires adoption and implementation of policies that will provide a good match between the qualifications and skills of those seeking employment with the manpower needs of Saudi employers. The Sixth Plan also addresses the key issues and constraints that impede the employment of Saudis by private sector employers and enhance replacement programs in different sectors and occupations.²⁶

Employment growth is high in the services sectors with an average annual rate of increase of 2.6% in the years 1994 to 1995, particularly in community and personal services, whereas, productivity is low (in terms of value added per worker). As a result, productivity in the non-oil sectors of the economy as a whole continued to decline, notwithstanding the fact that productivity in the producing sectors grew at a moderate rate.²⁷

Society is now accepting employment of Saudi women and the fact that women constitute an important organisational and financial resource in the national economy. The 5-year development plan has visualised providing specialised and expanded programs for women in both government and private sectors. These are aimed at creating business opportunities for women within the national economy.²⁸

The formation of a productive national work force through investment in human capital is a fundamental goal of all development efforts in Saudi Arabia. The rapid expansion of the Kingdom's education and training systems in successive development plans reflects the importance attached to this basic objective. The result of manpower development efforts takes longer to achieve than other development areas. As a result, large numbers of non-Saudi workers are needed to facilitate the development process. Increasing numbers of Saudi graduates in education and government training programs have begun to enter the labour market. Therefore, development efforts have concentrated on the expansion of job opportunities for Saudis, and on replacing non-Saudis in the private sector, which is expected to lead to future development.²⁹

The real wealth of Saudi Arabia ultimately lies in the productive skills of its labour force. Accordingly, the development plans have placed great importance on human resources development through continuous advances in primary, intermediate, secondary and higher education, as well as in technical education and vocational training. The total number of schools at all levels rose from 3,283 in 1970 to about 22,000 in 1994, while enrolment in all educational institutions increased from around 600,000 in 1970 to about 3.3 million in 1994 with an average annual growth rate of 7.1 percent. Enrolment in vocational training centres rose from 578 from 1970 to over

10,000 in 1994 -- an average annual growth rate of 12.6 percent -- while enrolment at technical schools and institutes increased from 848 in 1970 to over 28,000 in 1994, or at an average annual rate of around 16 percent.³⁰

The Saudi government has encouraged economic diversification through large public sector investment in capital-intensive industries linked to the Kingdom's petroleum resources. In the private sector, manufacturing industries have become more prominent and agriculture has emerged as a high growth sector in response to government incentives and funding. The rapid pace of economic development required a large number of foreign workers, thus highlighting the need to develop Saudi human resources and gradually reduce the reliance on expatriate labour.³¹

The average growth rate for Saudi manufacturing sector reported an 8 percent increase in 1992. The total number of employees in manufacturing sectors up to end of 1996 are reported as follows: 1994 = 182,047 employees; 1995 = 158,908 employees; 1996 = 186,495 employees respectively. The total number of licensed factories in Jeddah in the year 1994 was 510 out of which 317 were actively working and operated with 58,255 workers, representing 31.24 percent of the total labour force in Saudi Arabia for the year 1994.³²

Table 5.1 shows the major focus of the first four development plans and the amounts spent on major sectors.

Table 5.1 Expenditure of development agencies in the first Four Development Plans³³
(1970-1975 to 1985-1990)

Plan	First		Second		Third		Fourth	
	SR million	%		%		%		%
Economic Resources	9,469	27.7	97,279	28.0	192,185	30.7	71,193	20.4
Human Resources	7,034	20.6	51,035	14.7	115,007	18.4	115,133	33.0
Health and Social	3,515	10.3	27,600	7.9	61,237	9.8	61,882	17.7
Infrastructure	14,116	41.4	17,298	49.3	256,795	41.1	100,738	28.9
Total	34,134	100.0	347,212	100.0	625,224	100.0	348,946	100.0

Source: Ministry of Planning: Riyadh, Saudi Arabia

During the First and Second development plans, expenditure on infrastructural development accounted for between 41.4 percent and 49.3 percent of total expenditure respectively. In the Third development plan, 4.1 percent of expenditure was devoted to the completion of physical infrastructure, while 30.7 percent was directed towards the development of economic resources. Because of the Fourth plan's concentration on qualitative development and improvements in economic performance, human resources development accounted for 33 percent of total expenditure, while expenditure on health and social development amounted to 17.7 percent of the total.

5.5 Saudiisation of the work force in Saudi Arabia

The new entrant Saudis to the labour market have shown a marked preference for employment in the government sector, needless to say. The new entrants benefit from the higher wages paid at middle level positions and will be provided greater job security and better working conditions, in terms of working hours, employment

regulations and promotion prospects. It was estimated that about 261,000 public sector jobs are currently filled by non-Saudis, most of which could be occupied by suitably qualified Saudis in various locations throughout the Kingdom. However due to inadequate numbers of Saudi graduates in scientific, technological and technical fields in general, and in various medical specialisations in particular, there has been a failure in implementing the replacement program especially in the government sectors. In addition, the difficulties faced by female graduates in taking up job opportunities in locations far from their families and homes and the consequent failure to replace non-Saudi female workers with Saudis, particularly with respect to female teachers is the second most common hindrance.³⁴

The Sixth Plan (1995-2000) assigns the highest priority to the employment and training of Saudi nationals in private industry, where they now represent only a small percentage of total employment, particularly in production and technical jobs. Saudi youths also need to be attracted into technical and industrial training, so that they can become qualified industrial workers. At the same time the private industrial sector will be urged to fulfil its responsibilities towards achieving the national objectives of Saudiisation.³⁵

It has been reported that by the year 2000 the Saudiisation process should cover 56 percent of current labour force, which means, 151,200 Saudi's and 118,800 non-Saudi's will be working in manufacturing sectors.³⁶

The Gulf Cooperation Council countries (GCC) are also carrying out similar programs as that of Saudi Arabia's Saudiisations programme.³⁷

5.6 The role of private sectors in Saudi national economy

From the outset of the Kingdom's development planning, the adoption of free market principles ensured that private enterprise would always be the main focus of economic activity. By the beginning of the Fourth plan, a greater integration between the government and the private sector emerged. Most of the infrastructural projects had been completed and the priorities for development had shifted towards structural change and economic diversification. Through a wide range of financial regulatory measures, the government encouraged the private sector to engage in joint ventures with foreign firms and to invest in output-generating capacities in agriculture and the manufacturing industry. In return, the private sector became less dependent on government expenditures. The growing number of private sector companies continued to rise along with the volume of private capital investment and the range of private manufacturing activities. It was indicated that private investment rose from SR 1 billion in 1970 to about SR 46 billion in the last year of the Fifth Plan in 1995. The private sector's contribution to GDP rose from 21% in 1976 to 45% in the last year of the Fifth Plan in 1995, likewise, the private sector employment rose by 4.7 % between 1970 to 1975. The stock market has grown rapidly in recent years, as the number of shares of trade rose from less than 15 million in 1988 to more than 60 million in 1991, while the value of transactions over this period increased from about SR 760 million to over SR 17 billion.³⁸

The Sixth plan also attributes to the private sector an important role in mobilising its resources for the development of the national economy. One of the main themes of the development plan is the opening up of more opportunities for private sector investment and the achievement of greater economic efficiency in the govern-

ment and private sectors. Table 5.2 shows the major indicators of private sector development in terms of *billion Saudi Riyals*.

Table 5.2 Major indicators of private sector development

	<u>1975/1976</u>	<u>1993/1994</u>
Number of Operating Companies	1,473*	7,643**
Invested Capital (SR Billion)	7.0*	108.7**
Contribution to GDP (%)	21.0*	45.0**
Contribution to Fixed Capital Formation (%)	34.0*	67.0**
Employment in the Private Sector (million)	1.7	6.0

Source: Ministry of Planning: Riyadh, Saudi Arabia

* in 1976 ** in 1993

5.7 The development of Saudi industrial organisation

The discovery of oil in the land of the Kingdom of Saudi Arabia has triggered profound transformations and changes in its social and economic structure. The Saudi market has opened up to world products, economic activities have significantly increased, the standard of living risen. This significant change in social and economic structure has been accompanied by an increase in the demand for goods and services which in turn has led to economic and commercial movements in different areas of the Kingdom.

The successive development plans have stressed the importance of industrialisation to the achievement of the Kingdom's objectives. In the current structural features of the Kingdom's Industrial sector emerge the three distinct sub-sectors:

the petrochemicals industry that constitutes the cornerstone of the Kingdom's industrial development; the 'oil refining' sector that adds value to the crude oil resources and enhanced industrial exports and 'other manufacturing' sub-sectors which are composed of large numbers of factories that produce a broad range of products. Most industrial activity is undertaken by the private sector.³⁹

Industrial development in the Kingdom is of a comparatively recent origin and essentially comprises three components: First, are the SABIC (Saudi Arabian Basic Industries Corp.) enterprises, which consist mainly of the downstream hydrocarbon industries and the heavy metals industry. These industries are normally referred to as the 'basic' industry sector. Second, is the large group of factories licensed by the Ministry of Industry and Electricity and best described as the 'formal' manufacturing sector. Most of these enterprises are privately sponsored and eligible for Saudi Industrial Development Fund loans. Their output is geared primarily to the domestic market, which is very open and competitive. The third group can be referred to as the 'informal' manufacturing sector, and is composed largely of labour-intensive small workshops in repair and small-scale production activities.⁴⁰

The joint efforts of the public and private sectors resulted in considerable achievements by the industrial sector in the Fifth plan period, as the average annual growth rate reached 4.3 percent for the sector as a whole, with the non-oil industries growing at an average annual rate of 2.2 percent and the oil refining industries by 7.5 percent annually. By the end of the Fifth plan, the industrial sector's contribution to non-oil GDP had reached 13.1 percent, of which petrochemicals accounted for about 10 percent, oil refining for 43 percent and other manufacturing for 47 percent.⁴¹ Based on the outstanding statistical records, it has been proven that

industrial sector has a prominent role to play in the growth and diversification of the economy.

5.8 Labour regulations in Saudi industry

Labour regulations in Saudi Arabia are firmly controlled by Saudi labour law.⁴²

In the boom era, the Saudi government opened the door for the business sector to bring into the country as many foreign workers as they needed to finish the infrastructure projects. Many businesses were created for the sole purpose of arranging with foreign entities for the procurement of skilled labour. Employment contracts are watched closely in Saudi Arabia. Saudi employers may enter into employment contracts and must adhere to the terms of Saudi Labour Laws.⁴³

Saudi labour laws require all measures necessary for the protection of the workers from any hazard or diseases that may be exposed to them. The regulations give the employers responsibility for ensuring clean and healthy conditions in the workplaces. Precautions are issued to warn workers not to expose themselves to diseases caused by gas, smoke and any other exhausts emanating from the operation. Every employer shall prepare for each workmen a medical file showing the result of the medical examination performed upon commencement of the employment, a description of the case of illness and the stages of the treatment.⁴⁴

Labour regulations lay down the general rules in determining daily working hours, the number of working days per week and official and ordinary holidays and vacations. Accordingly, no worker is required to work more than eight hours per

day, provided that in the holy fasting month of Ramadan, working hours for Muslims only does not exceed six hours daily.⁴⁵

The level of social services extended to the workers reflects directly on their efficiency and volume of productivity. It also reflects the role of workers achieving society's socio-economic developments. Special provisions were made in labour regulation concerning the expanded social service programs, and stated that.....

*"any employer having five hundred or more workers is required to set up a savings, thrift plan for the workers. The employer shall provide the workman with suitable rest area and recreational facilities in accordance with the specifications by the Ministry of Labour and Social Affairs. Recreational facilities involved are the provision of parks and athletic fields annexed to the place of work, as well as cultural libraries for the workmen. There is provision of shops for selling food, clothes and other necessary commodities at moderate prices in workplaces."*⁴⁶

5.9 Summary

As the preceding discussion shows, through the evolution of Saudi Arabia's Five-year development plans, the manufacturing sector is becoming the focal factor of the national economy of Saudi Arabia.

The specific emphasis on the Saudiisation programs in the Sixth development plan (1995-2000) was discussed which aims to replace non-Saudi work force by young Saudi graduates from vocational and technical schools.

Thus, the government has placed a great importance on the private sector to facilitate all possible means of attracting young Saudi graduates to work in manufacturing firms. One of the attracting aspects is by improving manufacturing workplaces through provision of healthy working conditions in addition to the

improvement of support facilities such as recreational services, including rest areas, refreshment facilities, aesthetics and cultural libraries.

Therefore, it is the concern of this study to explore the role of the provision of physical elements in lounge spaces on the levels of informal communication in Saudi manufacturing workplaces. Thus, it is hoped to provide a design guidelines for factory building designers and design makers in upgrading manufacturing workplaces in order to motivate young Saudi graduates to work in manufacturing sectors and therefore fulfil the objectives of the Sixth development plan.

Furthermore, findings of this study will be useful not only in the Saudi setting but also in some other GCC countries since similar concerns are carried out in respect to replacing foreign work force by local young graduates.

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CHAPTER - 6

RESEARCH METHODOLOGY AND METHODS OF DATA COLLECTION

6.1 Overview

This chapter explains the research methodology and methods of data collection.

The first section illustrates the different parameters and considerations that govern the study. It also gives the guidelines and framework of the research.

The second section gives a systematic description of the method of locating the study test sample by giving an overall idea of the Industrial sector in Saudi Arabia, focusing on Jeddah City Industrial Community and the selected study test samples which are the concern of the study.

The third section deals with the research design which is explained in a diagrammatic illustration that gives an overall description of the process of conducting the statistical analysis of the study variables.

The fourth section discusses the method of data collection. It describes how the questionnaires are made to measure the dependent and independent variables of the study.

The fifth section examines a case study profile which gives indications of similarities in social and organisational attitudes and expectations.

The sixth, seventh and eighth sections deal with the tools and methods of measuring dependent and independent study incorporated variables.

6.2 Research parameters and framework

Informal communication in this study refers to unstructured information exchange that tends to occur in a face-to-face encountered interaction during OFF-TASK moments.

Informal communication is an activity which can be affected by several variables such as the nature of work, size of organisation, social attitudes, cultural background, sex, religion, organisational structure, objectives, policies, physical features, quality of spaces and layout of spaces. Therefore, the study focuses on one factor affecting the level of informal communication, which is the provision of physical design features in the lounge space of an industrial organisation.

The main concern in the selection of the study test sample is the availability of lounge space in the workplace. All selected case studies show a common factor of break time from 12:00 am to 1:30 p.m. Another determinant is the number of employees which fall into categories A, B, C, D as explained in Table 6.3. The staff selected from the factories were all men in as much as the Saudi culture segregates male and female in a workplace. The researcher has conducted a pilot study of the Study Test Sample and developed a lounge physical design features checklist.

Other parameters showed that all seven selected factories operate similarly in terms of location of work within the workplace, *i.e.*, all staff production and administrative work are within the factory territory and do not work from home.

Through the conducted pilot study, the researcher found out that the English language is dominantly used by all production and administrative workers since the majority of them are non-Saudis coming from such countries as Philippines, Pakistan, India, Sri-Lanka and Bangladesh. Therefore, it was a shared view by the

selected organisations to have a policy of unifying the language of communication. Religious aspects likewise vary and it was also found out by the researcher in the pilot study that religion is not considered as an important factor in decision making especially in hiring an employee.

As mentioned earlier, the most important factor in selecting a case study was the availability of a lounge space where informal communication during off-task hours is expected to take place. As deliverable refreshment facilities are an important aspect of the study, the provision of vending machines have been used to test the level of informal communication in lounge areas. All seven selected study lounge spaces have been observed and tested with the existence of vending machines and without vending machines to find out the effect of physical design features in determining the level of informal communication.

6.3 Methods of locating the study test sample

To locate the study test sample, the researcher conducted a quantitative accounting of different Saudi factories and found out that the total number of factories in Saudi Arabia is 2,305 based on recent 1995 information released by Ministry of Industry.¹ The number of working employees totals 186,495 up to the year 1995.² The number of working employees in the different sectors of factories in Saudi Arabia are as follows: (1)Food Products Industry = 340; (2)Paper Products Industry = 161; (3)Chemical Industry = 384; (4)Building & Decoration Industry = 445; (5)Metal Industry = 644 ; (6)Wooden Industry = 100; (7)Textile Industry = 87 (8)Storage industry = 21; and (9)Other Industries = 123.³

Two industrial cities have been established in Saudi Arabia which are Jubail and Yanbu. Jubail industrial city is located on the Eastern Coast of Saudi Arabia, there are about 20 industrial firms. Fifteen of these firms are made up of Oil refineries, Iron and Steel factories and five Petrochemical complexes and factories for production of methanol, fertilisers, sulphur and gas.⁴ Yanbu is located on the West Coast of Saudi Arabia, 350 kilometres north of Jeddah. It represents the final destination of the oil pipe line from East to West. It is considered as an international centre for exporting crude oil, refined oil products, and petrochemical products.⁵ The city consists of three (3) large oil refineries, a huge petrochemical complex in addition to many secondary light and supporting industries.

A detailed numerical review of Saudi Arabia's industrial sector using available statistical data up to 1994 showed Jeddah city to represent the largest number of factories with 510 licensed factories, out of which, 317 are active working factories with a total work force of 47,929 employees, and an annual increase of 1.7 % in the labour force.⁶ Jeddah is the biggest city which contains the largest industrial community in terms of number of factories as well as number of labourers. It comprises 22.13 % of the total number of Saudi factories and 25.7 % of the total work force of Saudi Arabia.⁷

In addition, Jeddah's importance lies not only as the most active industrial location in Saudi Arabia but also as the most active seaport as well as a trade exchange point in the Middle East.⁸

Therefore, the researcher has chosen Jeddah Industrial Community as the setting of the study so that the results and recommendations which could be gathered

from the study can be used as a guideline among the other industrial communities of Saudi Arabia.

As illustrated in Table 6.3, factories in Jeddah were categorised by the researcher into 4 groups in relation to the number of employees working in the factories. The first category starts with 100 employees, since it is assumed that the least number of users of vending machines in workplaces should not be less than 100 persons in order to have an economical outcomes.⁹

Table 6.3 Category of factories vs. number of employees in Jeddah industries

Category	No. of employees	No. of Factories
A	100 to 200	56
B	201 to 400	40
C	401 to 600	11
D	601 plus	5
		112

Table 6.3 indicates that the factories are divided into 4 categories A,B,C,&D as in column I. Column II shows the correlated number of employee, *i.e.*, category A-from 100 to 200 employees; B-from 201 to 400 employees; C-from 401 to 600 employees; D-from 601 employees and above. Column III shows the related number of factories in each category which is A-56 factories; B-40 factories; C-11 factories; D-5 factories, totalling to 112 factories in all. This step enables the researcher to select the first partial sample of 112 factories out of 317 factories in Jeddah which are grouped according to the number of employees within each category.

Having selected a pilot study, the researcher visited the 112 factories and met with the factory Administrative Manager. The main objective of the visit was to investigate the availability of lounge spaces, size of lounge space (if any), working time and to seek permission to conduct further study within the lounge space (if any) in the factory.

Table 6.4 (*see appendices*) indicates the result of the pilot study. It was designed by the researcher in order to clarify the following:

- 1 - Column I : Each factory was given a serial number in order to give a numerical identification rather than its alphabetical name to facilitate retrieval of the factory in any future work.
- 2 - Column II : Factory full name
- 3 - Column III : Indicates the category of the factory based on hypothesised categories in Table 1.
- 4 - Column IV : States the number of employees as of August 1994
- 5 - Column V : Indicates the availability of lounge space by sub-column YES=available lounge space, NO=no lounge space is available. The third sub-column indicates the approximate square meters of the space (in case the researcher was allowed to inspect the space).
- 6 - Column VI : Indicates the availability of vending machine (in cases where researcher was allowed to install the machine).
- 7 - Column VII : States the working hours of production line shifts (in some cases, one shift working time represents the production and administrative staff working time).
- 8 - Column VIII : Represents the initial acceptance by the administration to allow the researcher to conduct the study in their factory.

Table 6.4 (*see appendices*) also shows the different sectors of industries with their corresponding factories as supplied and categorised by the Saudi Ministry of Industry and Electricity Industrial Sector-1994.

Table 6.5 (*see appendices*) Jeddah selected industries was proposed by the researcher in order to identify the final study sample and their relative information is as follows:

- 1 - Column I : Sector Number;
- 2 - Column II : Sector Name;
- 3 - Column III : Number of factories per sector;
- 4 - Column IV : Availability of lounge space (Yes/No) in relation to assumed categories in Industrial sectors.
- 5 - Column V : Final study test sample with respect to availability of lounge space, category, sector kind and number of factories.

Table 6.6 Study Test Sample setting (*see appendices*)

This table gives a closer look at each of the study test factory samples in terms of serial number, factory name, sector name, category, number of employees, approximate area of the lounges available and the factory's corresponding working time and break time in between working hours.

The findings of (Table 6.3, 6.4, 6.5 & 6.6) concluded as follows:

- 1 - The study focused on 112 factories presented for study setting.
- 2 - From the total of 112 factories, only 7 factories gave the researcher initial acceptance to conduct study testing (direct observation, and questionnaire) in their lounges as against 105 factories which did not co-operate in this study

application due to the following reasons:

- A - All of the 105 factories are privately owned factories (either owned by one owner or two and/or shareholders) and it was beyond the Administrator Manager to decide acceptance; it needed the owner's approval. The researcher allowed 20 working days to receive a reply but failed to receive responses.
- B - The researcher observed that 95% of the factories did not follow any local and international safety standards and codes such as SASO 9000. In this regard, most administrations tend to be extremely conservative and cautious about allowing outsiders to move freely within their factory premises and interview their labour force.
- 3 - Out of 112 factories, 76 factories had available lounge spaces and 36 factories did not have lounge spaces in particular.
- 4 - The study test sample included three factories in Category A, two factories in Category B, one each in Category C and D.

From Table 6.6, seven factories were chosen which cover the four categories A,B,C,D that were hypothesised by the study. The researcher considered the variation of size as a positive sign in order to give future reference to the different studies in each category. All seven factories accommodate lounge space within their factory buildings. All seven lounges were accessible to both the Production area and Administrative office. All seven lounges were provided with a catering service in and a variety of food selections for sale to the employees. The seven factories selected are considered as part of the manufacturing organisational sector which serves as one of the main hypothesised criterion of the study.

Manufacturing organisations, in general, share the same objectives and policies in terms of productivity and performance. In Saudi Arabia, most of the manufacturing organisations share relatively same attitude in respect to their work environment and treatment of employees. Since no high tech. *i.e.*, robot and advanced automated machinery were being used, the production and administrative work atmosphere were considered relatively similar. Management style was also similar since all seven factories are privately owned companies.

Lounge space is defined here as an indoor space controlled by the factory administration and intended to used by workers for food supplies and entertainment facilities during off-task moments.

Furthermore, factory workers are defined here as production and administrative workers of an organisation which are categorised as follows:

- 1- *production workers* categorised as:
 - a.) production line labourers
 - b.) production line supervisors
 - c.) production managers
- 2- *administrative workers* are all workers who participate in the administrative jobs.

Informal communication is considered to be the dependent variable in this study. Physical design features and organisation are the independent variables.

A combination of methods consisting of questionnaires, interviews and direct observations were used to survey a sample of existing study sample factory lounges. It was anticipated that the lounge spaces that were used most frequently and most appropriately would be marked by a number of environmental design characteristics. Firstly, the lounges would be centrally located, *i.e.*, near administrative offices, near production line areas and with flow-through traffic.

In addition there would be house facilities which attract production workers and administrative staff, including coffee makers, vending machines, refrigerators, mailing box, seating chairs, tables, newspapers, television and the like. These physical features would combine fashion and comfort in the use of the lounge space.

As per the conducted pilot study, the lounge space in the seven selected factories was furnished with dining tables and chairs. They were different in quality from one to another but all had the same function. All seven lounges were open space without having special enclosed spaces allowing all employees to be treated equally, regardless of titles or management structure levels. They are intended to induce informal communication at all times among factory workers, production and administrative staff.

It is assumed that many factories have such designated spaces as lounges. It is also assumed that some of these lounges are generally successful and others are not. The researcher inferred here that success is the degree to which the lounge area is used as intended, particularly with regards to informal communication among production workers and administrative staff.

Moreover, a successful lounge would be one that is frequently occupied during off-task moments and in which social conversation frequently occurs among factory workers. Unsuccessful lounge space would be most often empty and when used, the activity of occupants would frequently be of a solitary nature (*e.g.* napping).

The researcher conducted a pilot study and listed the following common features in selected factory lounges. This is represented by 29 hypothesised physical design features and are categorised as follows:

A - ATTRACTANTS

1. mail box
2. public telephone
3. reading materials
4. sink
5. vending machine

B - BEHAVIOURAL PROPS

6. dining seats
7. sofa
8. dining tables
9. video games
10. video films

C - HOLDING POWER ELEMENTS

11. bulletin board
12. coffee maker
13. hot water boiler
14. food services
15. microwave
16. television

D - LOCATION

17. central location within the factory building
18. at cross pathway
19. on or near major traffic way
20. flow-through traffic
21. near production area
22. near administrative area

D - AESTHETICS

23. windows
24. decor
25. aural (hearing contact between passers-by and occupants)
26. visual contact (between passers-by and occupants)

F - CLIMATE

27. light
28. noise
29. temperature

Through the observation process the researcher made on the spot checklists of the use of lounge spaces during regular working days followed by a questionnaire to the manager of the factory. A direct questionnaire to the factory administrative manager by the observer was made through an interview session in order to determine the importance placed upon informal communication between workers in workplace.

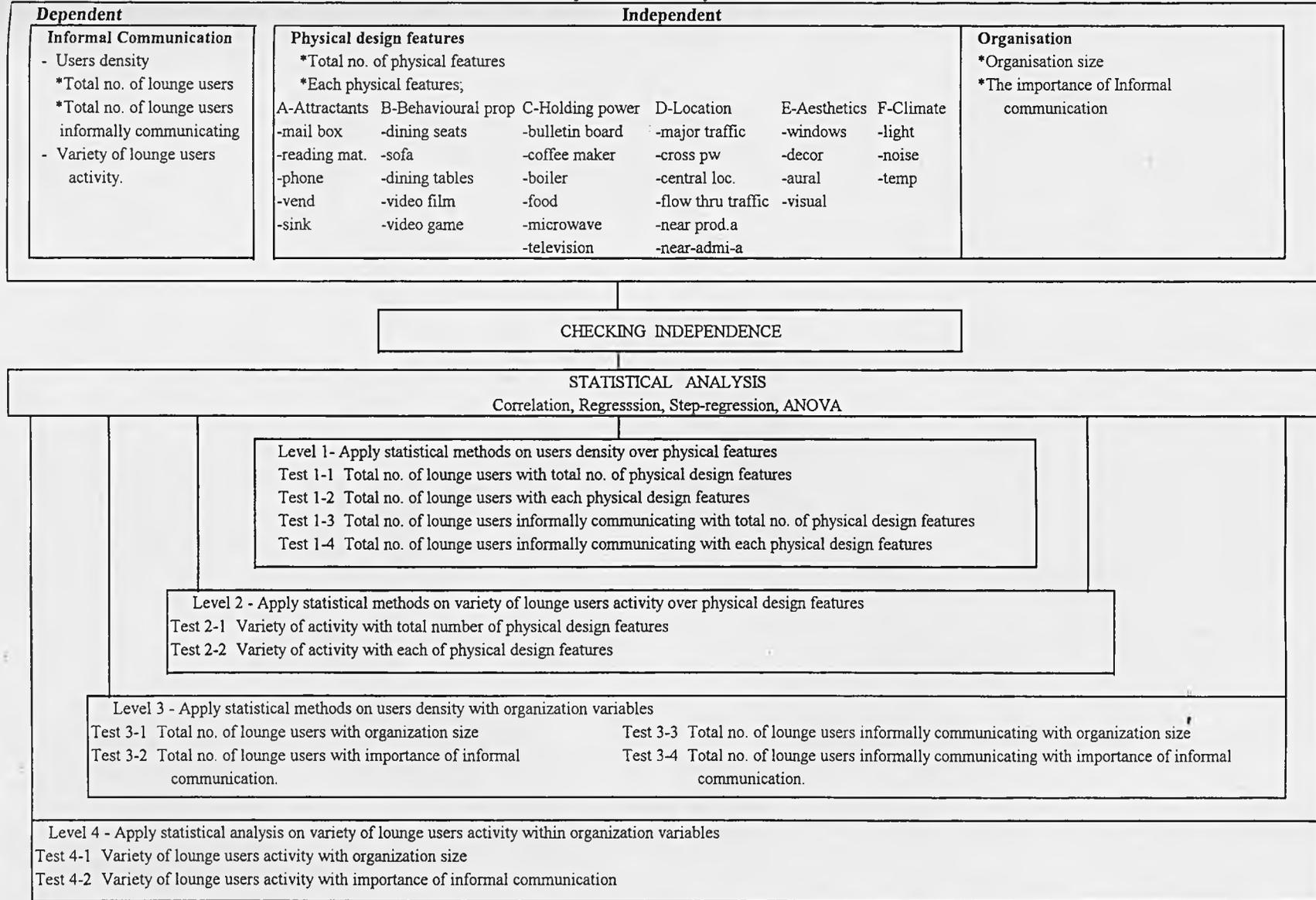
The checklists include the following:

- 1 - Average number of production workers using the lounge space
- 2 - Average number of administrative staff
- 3 - The type of behaviour most likely to be observed such as conversation, reading, studying, eating/drinking, smoking, playing games, passive/awake, asleep, watching t.v., calling telephone and others.

6.4 Research design

The researcher has developed a diagrammatic illustration *Figure 6.1*, relating to the process of application of the problematic area of study. There is one dependent variable (informal communication) and two independent variables (physical design features and organisational variable).

**Figure 6.1 RESEARCH DESIGN
Incorporated Study Variables**



The “informal communication” was studied at different intervals of time and circumstances through observations. Lounges were studied at 2 days per week and 4 weeks per month. The observations took place during a two-month period, *i.e.*, one month (8 observations) those without vending machines and in the other month (8 observations) those with a vending machines. Thus, a total of 16 observations per factory were made. Total observations therefore, were 112 times in all seven factories.

Informal communication is divided into two variables namely Users density and Variety of Lounge users Activity. Users density refers to the use of lounge space in terms of the total number of users in it on each observation and the total number of users of lounge space informally communicating.

Each lounge used was observed and recorded with the total number of users socialising and not isolated . It was assumed by the researcher, that any communication which occurred among workers within the lounge space was of an informal nature.

Variety of activity is the second variable and is concerned with the different activities widely practised in the lounge space. Based on the observation sheets, the researcher hypothesised different activities which might be practised by the users in the lounge space. These activities include eating, drinking, playing games, watching television, reading, smoking, relaxing, gossiping, discussing work duties and discussing social matters.

The first independent variable is physical design features which include twenty nine different features: 1-vending machine; 2-seating and dining chairs; 3-seating sofa; 4-dining tables; 5-windows to outside viewing; 6-sink; 7-lounge temperature;

8-coffee maker; 9-hot water boiler; 10-food service; 11-mail box; 12-microwave; 13-reading materials; 14-light; 15-noise; 16-location; 17-flow through traffic; 18-cross pathway; 19-central location; 20-near production area; 21-near administrative area; 22-visual contact; 23-aural(hearing) contact between passers-by and occupants; 24-public telephone; 25-television; 26-video tape showing educational or recreational films; 27-video games; 28-bulletin board and 29-decoration level.

The second independent variable is organisation. For the purpose of the study, the organisation variable is investigated in two perspectives, first is the size of the organisation in terms of number of workers, second, is the importance with which each organisation views informal communication because they vary according to their organisational policies and regulations. In other words, if an organisation upholds informal communication among its workers it will differ from the one that does not accept such activity, where workers are cautioned not to practice informal communication while at work time.

The second step was to check the incorporated variables with each other in order to eliminate the highly correlated variables and to ensure that all variables being taken into account are independent. Different statistical analysis shall then be applied which are correlation, regression and step-regression in order to test the dependent variables and independent variables.

These statistical analyses were done at 4 levels. In each level, each statistical method was applied in order to obtain the numerical relationship between the different variables and predictors.

Level 1 includes the application of statistical methods on users density over hypothesised physical design features. This includes 4 sub-levels of analysis which are:

1.1- Total number of lounge users with total number of physical design features.

1.4- Total number of lounge users informally communicating with respect to each physical design feature.

Level 2 uses statistical application on a variety of activities over physical design features.

2.1- Variety of activity with total number of physical features.

2.2- Variety of activity with each physical feature.

Level 3 utilises statistical methods on users density with organisation variables.

3.1- Total number of lounge users with organisation size.

3.2- Total number of lounge users with importance of informal communication.

3.3- Total number of lounge users informally communicating with organisation size.

3.4- Total number of lounge users informally communicating with importance of informal communication.

Level 4 applies statistical methods on the variety of activities with organisation variables

4.1- Variety of activities with organisation size.

4.2- Variety of activities with importance of informal communication.

The above statistical methods were conducted in order to test the study hypothesis from different parameters.

6.5 Case study profile

The seven factories were selected to be the study test samples. All selected cases fall under one sector of activity, *i.e.*, the manufacturing sector but are involved with different types of products under the industry category.

The categories are divided into 4 levels based on the number of employees, *i.e.*, Category "A" from 100-200 employees; Category "B" from 201-400 employees; Category "C" from 401-600 employees and Category "D" from 601 employees and above.

Using the percentage ratio of the number of employees vis-à-vis the total number of factories, the researcher found that category "A" represents 50% of the total number of factories in Jeddah Industrial community. Therefore, it was deemed appropriate by the researcher to include the three factories in category "A" which met the study requirement. On the other hand, category "B" represents 33.70% of total number of factories in Jeddah Industries where two factories were found matching the study requirement. In category "C" there is 9.8% ratio of the total number of factories and one factory was selected matching the study requirement. Category "D" represents 4.5% of total number of factories and one factory was found to match the study requirement. (*see Table 6.3*)

Organisation structure is considered constant in the seven selected case studies with a hierarchical system of management. Sex is constant since all employees were males. Social and religious beliefs are different amongst each factory because labour manpower is taken from a mixture of different nationalities with different cultural backgrounds. It was assumed by the researcher that if the hypothesis proved positive

with such differences, it will be extremely successful when the Saudiisation program is completed and the majority of factory workers are Saudis sharing same social and religious backgrounds.

6.6 Methods of data collection

Empirical research, in general, is divided into four basic strategies used by industrial psychologists to implement their approaches to the study of factory workplaces.¹⁰

The strategies include, field experiments, laboratory experiment, field studies and surveys.¹¹ Even though they differ in some respects all involve the systematic assessment of behaviour or attitude in relationship to variation in the physical environment.¹²

The purpose of a field experiment is to assess the consequences of a change introduced into the environment, usually on production or worker's attitudes. The environmental variable is treated as a causal agent, and the experiment as a way to determine its effects.¹³

The second type of research strategy is laboratory experiment which is conducted in a laboratory where conditions of the environment can be controlled; participants can be randomly assigned and their behaviour can be measured under standard conditions.¹⁴ Laboratory experiments are criticised for their artificiality and brief duration which might draw out behaviour unrepresentative of what occurs in the workplace.¹⁵

Field studies is the third type of research strategy which seek to discover correlations of properties of environments and behaviour or attitudes of the occupants.¹⁶ One difficulty in the field research is the possibility that the procedures of measurement may unintentionally change or alter the behaviour of the workers under study.¹⁷

The fourth research strategy is survey which includes a questionnaire or systematic interview that provides standard questions to employees about their work environment.¹⁸ Moreover, a survey usually serves three purposes. First, it provides an opportunity to assess the prevalence of specific attitudes or problems; second, it allows an assessment of the correlations among subjective reactions and reported properties of the environment. Finally, surveys provide a vehicle for evaluating a building as a whole by investigating the reactions of occupants on a wide range of issues including temperature, air quality, noise and privacy. The disadvantages of the survey method lie in the possibility of expressing personal responses.¹⁹

However, each of the empirical research approaches has its strengths and weaknesses.²⁰ Therefore, a combination of different methods could be useful in specific types of researches. Sundstrom (1988) argued that the ideal approach to studying the psychology of the workplace applies different strategies of research to the same problem, so questions left unanswered by one strategy can be answered by others.²¹ Moreover, he stated that the current status of empirical research on work places is uneven and in some areas primitive.²²

As a consequence of the previous discussion of the different empirical research strategies, the empirical research strategy of this study will be conducted by using a

combination of methods which include 1) field experiments; 2) field studies (direct observation); 3) survey (interviews & questionnaires) technique.

As Berry & Houston (1993) stated that

*“direct observation is useful for studying particular kinds of behaviour, whenever a behavioural pattern is highly complex or relatively unknown. Direct observation is the best way to begin a study of it. When the behaviour actually involves interaction, as in interpersonal or inter group activities, this method again is most appropriate.”*²³

The selection of this combination of methods is based on the intention of the researcher to unify methods of research strategies as in respect to Campbell & Campbell's (1988) study of the link between elements of the physical environment and informal communication in an educational setting, so that findings can be compared with absence of the uncertainty usually found in different empirical findings due to the differences of research methods.

In this study, each of the factory managers was asked about the importance of informal communication among factory workers. This was followed by specific questions regarding the use and intended use of lounge spaces. Following this interview, the researcher inspected each selected lounge area and completed a checklist of the 29 physical features that were found in selected spaces. Finally, a direct systematic observation was made of each space in order to determine how these lounge spaces were used. During each of these observations the observer noted the number of people in the lounge and each person's activity. The observation was made briefly

and unobtrusively so as not to disturb or change the behaviour of the lounge occupants. Data from repeated observations of a lounge were averaged to provide a reading of typical use.

Each factory head and production manager was interviewed by the researcher in order to understand the important role played by the organisation in informal communication among production and administrative staff.

Interviews, as designed by the researcher included nine questions as follows:

(1) How do you rate the general importance of informal communication among production workers and administrative staff in your factory? (2) How important is informal social interaction on a day-to-day basis within your factory? (3) What provisions are there to maintain communication and avoid insularity among production workers, and administrative staff in your factory? (4) Is there a commonly known gathering for interaction in your factory? (5) Is there another place(s) as such? (6) Is there a place that might loosely be called your factory lounge? (7) To what extent is an appropriately designed area needed in your factory? (8) What is the size of your factory? and (9) Is there an area provided for individual factory workers?

Following the interviews, direct observations were conducted by the researcher to investigate gathering place description, physical features and behavioural attitudes of users, (*see appendices*), during regular working days of the selected seven factories within a 4-week period (to measure full month start, middle, and last week). It was assumed by the researcher that due to worker's financial obligations, their purchasing behaviour tended to change during the days, *i.e.*, first two weeks of the month, workers are financially relaxed while during the last two weeks they tend to be stretched due to their personal financial obligations.

Table 6.7 which is the Data Collection Schedule pertains to the seven factory lounges which were inspected. The first observation made without the presence of a vending machine was conducted with a total of 56 observations. Since there were seven factories to be observed the frequency was distributed at one observation per day and two observations per week in 4-week time.

Other observations were carried out in the month of April '95 with a total of 56 observations. The same procedures were applied to all 112 observations. These observations were later examined through the Minitab Statistical Program.

6.7 Tools for measuring dependent study variables

In this study informal communication refers to relatively unstructured exchanges of information among factory workers during "off-task" moments encountered in factory workplaces.

It must be noted that different researchers and studies describe interaction in different forms such as frequency, latency, users density, sequence and duration.

Since interaction is one of the processes of informal communication it may be measured in different ways such as (1) Frequency which refers to the number of times an event occurs. (2) Users density which refers to the total number of seconds involved in the activity. (3) Latency which relates to studies of internalisation, self-control and resistance to temptation. (4) Duration refers to the length of time required for an event to 'run-off'. (5) Sequence relates to the sequential pattern of an event to occur during an ongoing behaviour scheme of a single or a number of individuals.²⁴

According to the report of Lamb, Suomi and Stephenson (1979)... frequencies have been most widely used in the literature; other measures which have been used were relatively rare. Frequencies from which rate measures are derived have dominated the literature for two main reasons: (a) to determine the presence or absence of an act, either in terms of its onset or its ongoing occurrence and involves a conceptually straight forward judgement and (b) the rate of the occurrence which is widely believed to be correlated with the strength of the internal response disposition or the frequency of prior reinforcement, *i.e.*, the measure is theoretically relevant.²⁵

Informal communication in this study was measured in terms of the frequency scale. The work of this study did not attempt to focus on duration, purpose and confidentiality, instead, the focus is specifically to rate the presence or absence of informal communication as well as to determine the factors motivating its presence or the decrease of occurrence.

6.8 Measuring the independent study variables

The researcher presented a checklist for the physical features of the tested lounges which was checked once every observation day. Experimental techniques in addition to direct observation were also made. All case study lounges were observed 56 times without a Vending machine (refreshment facility element) and another 56 times was carried out with a vending machine present. This was done in order to inspect and observe how informal communication patterns can be increased or decreased through the introduction of a new physical element to the space. The checklist included 29 hypothesised physical features related to the use of the space.

The observation was made briefly in order not to disturb the occupants. The observer in each observation took note of the number of people in the lounge space, and the type of activity being practised. Each person's activity was observed and noted in the observation format and the total number of persons interacting in an informal discussion was also noted.

The observation guide designed by the researcher was parallel to the one used by Campbell & Campbell's (1988) study in an educational setting. As mentioned earlier the observation is divided into three different parts: Observation 1 deals with the gathering place description ; Observation 2 deals with the physical feature checklist and Observation 3 deals with the behavioural checklist.

Physical features are divided into six divisions which represent the different lounge space components. The first division deals with "attractants" such as mail box, reading material, public telephone, refrigerator and sink. The second division is "behavioural props" which include dining sets, sofa, tables and video games. The third division is "holding power elements" which include vending machine, coffee maker, hot water boiler, food, flip chart, microwave, television and bulletin board. The fourth division is "location" which identifies the lounge space location in terms of traffic way, cross pathway, centralisation in reference to factory departments, flow-through traffic, near production area and near administrative area. The fifth division is "aesthetics" which includes windows, decor and complexity of visual auditory and movement. The sixth and the last division is "climate" which deals with lounge temperature, light and noise level.

The third part of the observation, 'the behavioural checklists', was designed to extend the score of the first and second observation, 'gathering place description' and

'physical feature checklists'. The behavioural checklists indicates the total number of people using the lounge space. Activities hypothesised by the researcher include eating, drinking, playing games, watching television, reading, smoking, relaxing, gossiping, and informally communicating with each other.

Furthermore, the organisation variable was tested. First, with respect to its size in terms of the number of employees, secondly, with respect to the emphasis of promoting informal communication among its workers.

6.9 Case study profile

All possible causes were considered and utilised to ensure similarities in over-all variables of the selected case studies. All selected factories share a similar work sector which is manufacturing and all seven organisations have relatively similar policies in operating their businesses. There is a provision of care and services to their employees. As regards to contractual agreement, it was found out that all selected factories were following the Saudi Ministry of Labour contracts, and in all seven cases, production and administrative staff perform their work inside the factory building and not from home. Organisational commitments to employee training were relatively similar in all selected seven cases.

Automation levels were constant in relation to office and production activities with the use of computers and telecommunication systems. The English language in all seven cases is considered to be the official language among production and administration workers. All staff in the selected cases were male. Organisation of the

seven cases have similar hierarchical policies in the allocation of spaces to different staff groups.

There was little difference in the daily work in all seven cases in terms of the nature of departments which were divided mainly in two activities, *i.e.*, administrative and production activity. With regards to the time of work, all seven factories share the same working hours for administrative and production staff, *i.e.*, 44 hours per week.

The researcher committed himself not to take photographs of the selected factories due to the confidentiality of each factory as well as from fear of competition. Through observation, however, all seven selected factories did not have any abnormal layouts in terms of traditional factory design. In other words, the factory buildings are divided into two sections connected to each other by corridors. One section is for administrative staff and the other for production activities with storing spaces for finished products. Lounges, a praying area and basic facilities such as toilets were provided in all cases. Production areas were mainly built of steel and the administrative section was built of traditional reinforced concrete slabs.

The next chapter will deal with the different characteristics of the selected lounges with regard to other activities in their buildings.

6.10 Summary

This chapter indicated the different methods and techniques that the researcher used in order to locate the study test sample.

The research design was summarised in a systematic diagram *Figure 6.1* to present a clear understanding of the overall statistical process of the study variables. The case study profile indicated the similarities of the selected study samples. Seven factories were selected to provide data for the study. Different aspects were discussed such as organisation size, business sector, existence of lounge space, organisational structure and social patterns.

Data collection method is an important part of this chapter which outlined the different methods used to collect the data of the study. These methods include questionnaires, interviews, and direct observations.

Moreover, the last two sections of this chapter explained the tools for measuring informal communication (dependent variables), as well as physical elements (independent variables) in organisation. Informal communication is measured by a frequency scale, while physical elements are measured by direct observation through a checklist indicating the presence or absence of the hypothesised physical design features. Organisation variable are measured through the number of work force (size of organisation) and the importance of informal communication in each organisation.

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CHAPTER - 7

TESTING STUDY HYPOTHESIS ON STUDY INCORPORATED VARIABLES

7.1 Overview

This chapter is designed to test the study hypothesis. The test will attempt to examine all the incorporated variables including dependent and independent variables. Correlation, Regression and Step-regression's statistical calculations were used to test the study variables. Correlation technique was specifically used for all incorporated variables to ensure that all of the variables were independent and could be treated statistically through Regression calculation. Each factory lounge was scored according to the total number of physical design features it had as in Observation-2, *i.e.*, "Physical Features Checklist". Informal communication as the dependent variable will be measured through frequency scale. Independent variables including physical design features will be measured through the observation checklist process, while the organisation variable will be tested using two different measures. First, the size of the organisation in terms of the total number of employees. Second, the outcome of the interview from the selected study sample in which factory heads were asked the importance of informal communication as practised by their employees in their organisation.

7.2 Study incorporated variables

The dependent variable was tested statistically with the independent variables and included four levels: 1-testing users density with physical design features; 2-testing variety of lounge user activities over physical design features; 3-testing users density with organisation variables; 4-testing variety of lounge user activities with organisation variables.

Each of the 4 levels included sub-level tests which measured all possible relations with the main dependent variable, *i.e.*, 'informal communication'.

Dependent and independent research study variables are tested by several statistical operations including analysis of variance (ANOVA), correlation, regressions, and step-regression.

It is assumed in this study that any correlation value above 0.31 is considered to have significant relation. Correlation values were tested in order to check the dependency of each variable . It was difficult to draw clear and solid findings from these correlation values because most of the variables have interrelated correlation with each other. Regression analysis was made between the variables and when there were more than two variables, Step-regression was applied to determine the significance of predictors as well as to eliminate the highly correlated ones from each other.

The researcher relied on the regression analysis more than correlation analysis for two reasons: first, regression analysis measures how much each variable contributes in explaining the variation in the main dependent variable through the value of R-sq. Second, in the case of correlation analysis, in some cases, the high correlation results of two variables is sometimes due to the influence of the third variable involved. R-sq value indicates how much the independent variables explains the level of variation in the dependent variable.

Thus, the higher the R-sq value is, the stronger the predictive power of the variable to explain the study dependent variable. The significance of the variable as well as the overall test was indicated by the P-value which expresses the percentage value of the probability that the coefficient of the predictor is not equal to zero. In

the overall study, statistical model predictors are chosen on a significant level where $P\text{-value} < 0.10$ in order to give informative data about the main dependent. In the correlation analysis, significant level was chosen when $r\text{-value} > 0.31$.

The r -value was rated by the researcher as follows: where $r = 0.21$ to 0.30 expresses weak relation; where $r = 0.31$ to 0.40 it expresses moderate relation; where $r = 0.41$ to 0.50 it expresses strong relation; and where $r = 0.51$ and larger it indicates very strong relation.

7.3 Testing the relationship of informal communication - Users density with physical design features

The users density level was determined by the total number of users of the lounge space and the total number of users informally communicating in the same lounge. This test was considered as Level-1 of statistical calculation. It included 4 tests. First is the test of the total number of lounge users with the total number of physical design features as illustrated in Table 7.1 and Table 7.5. The second is the test of the total number of lounge users with each of the physical design features which were hypothesised totalling 29 features illustrated in Table 7.2, 7.6 and 7.9. Third was the test of the total number of lounge users informally communicating with the total number of physical design features Table 7.3, 7.7, and fourth is the test of the total number of lounge users informally communicating with each of the physical design features, Table 7.4, 7.8 and 7.10.

Minitab statistical method was used to average the total number of lounge features and relate it to the different study-incorporated variables in statistical procedure.

Test 1.1.1 indicates the correlation of total lounge users with total physical design features. Table 7.1 shows the correlation values of total lounge users with total physical design features. It indicates that the total number of physical design features give a significant level of $r = 0.798$ with a very strong relation in predicting an increase in the number of lounge users.

Test 1.1.2 shows the regression of total number of lounge users with total number of physical design features. Table 7.5 shows a significant value of $R\text{-sq}=63.7$ and $P=0.000$. This means that the total number of physical design features explain 63.7% variation on the dependent variable and P-value shows a significant level of independent variable with the overall test.

To summarise, the overall relationship of the total number of lounge users with the total number of physical design features shows a significant correlation level of $r = 0.798$, $R\text{-sq} = 63.7$ and $P < 0.1$. The interpretation which can be derived from this level of statistical calculation is that the total number of lounge users has a positive relation with the total number of physical design features.

Test 1.2.1 shows the correlation of total lounge users with each physical feature. Table 7.2 shows that out of 29 predictors only 13 predictors have significant predictive power of explaining the dependent variable. Of the 13 significant predictors, 8 were found with $r > 0.51$ expressing very strong relationship with the dependent variable, *i.e.*, 'informal communication' - total number of lounge users.

The predictors are reading materials ($r=0.761$); mailbox ($r=0.761$); public phone ($r=0.720$); television ($r=0.761$); video tape film ($r=0.761$); video game ($r=0.761$); bulletin board ($r=0.761$); and sofa with ($r=0.574$) value. The remaining five predictors show a moderate to relatively strong relation in predicting dependent

variable: with window ($r=0.354$); sink ($r=0.348$); coffee maker ($r=0.348$); food ($r=0.348$); and location near major traffic way with ($r=0.350$).

Regression and Step-regression statistical applications were used to determine the degree of variation that independent variables explain in the dependent variable. They were also used to determine the degree of significance of the independent variable with the overall test.

Test 1.2.2 shows regression of the total number of lounge users on each of the physical design features. Table 7.6 shows that only 5 predictors express a significant level with $P < 0.10$. These are vending machine with $P=0.000$, sofa $P=0.000$, mail box $P=0.001$, microwave $P=0.046$ and location near major traffic way with $P=0.001$. Overall predictors show variation in explaining the dependent variable with $R\text{-sq}=95.2$ and significant level of the test is $P=0.000$.

Test 1.2.3 shows the step-regression was made between the total number of lounge users and each of lounge design features in order to confirm the predictors affecting the total number of lounge users. Table 7.9 determines the different independent variables in accordance with their predictive power importance. Out of 29 different physical design features, only 7 features show significant predictive power of $R\text{-sq}=90.55$ while other predictors have been eliminated due to their high correlation with each other. The bulletin board shows the highest prediction with $R\text{-sq} = 57.87$ followed by lounge location at cross pathway with $R\text{-sq} = 64.25 - 57.87 = 6.38$. The third predictor is the availability of food service which shows $R\text{-sq} = 74.99 - 64.25 = 10.74$. The fourth is vending machine with $R\text{-sq} = 79.12 - 74.99 = 4.13$. The fifth is hot water boiler with $R\text{-sq} = 82.64 - 79.12 = 3.52$ and the sixth is the

presence of a microwave with $R\text{-sq} = 87.31 - 82.64 = 4.67$. Finally, the last prediction is the sofa with $R\text{-sq} = 90.55 - 87.31 = 3.24$.

Out of 29 predictors, 7 predictors show significant relationship with the main independent variable, namely: bulletin board, location at cross pathways, food service, vending machine, hot water boiler, microwave and sofa. These predictors are classified under different environmental components which are based on conceptual and theoretical concerns. The classifications are A) Attractants- vending machine B) Behavioural prop- sofa C) Holding power- bulletin board, food, hot water boiler and microwave D) Location at cross pathway.

In all of the 7 predictors, the one with the positive relation with the total number of lounge users and the strongest and most significant predictor is the presence of the bulletin board which expresses 57.87 % variation in the dependent variable. At this level it can be concluded that the variation of desirable features increases the total number of lounge users and the probability of informal communication tends to occur among workers.

Test 1.3.1 - Table 7.3 shows the correlation of the total number of lounge users informally communicating with the total number of physical design features with very strong and significant relationship of $r = 0.790$. Furthermore, Test 1.3.1.- Table 7.7 indicates significant Regression value of $R\text{-sq} = 99.3$ and $P = 0.000$. Therefore, it can be concluded at this test level that the total number of physical design features have significant level in explaining the dependent variable and predicting the high value of total number of lounge users informally communicating.

Moreover, in order to investigate the relationship of the total number of lounge users informally communicating with each of the physical design features statistical

applications were made to find out which of the 29 physical features affect the informal communication levels positively.

Test 1.4.1 - Correlation of Total Number of Lounge Users Informally communicating with each of Physical Design Features. It was found in Table 7.4 that of 29 predictors, 13 predictors show significant relations $r = 70.31$. These are the following: television $r=0.739$; video film $r=0.739$; video game $r=0.739$; bulletin board $r=0.739$; public phone $r=0.698$; mail box $r=0.739$; reading materials $r=0.739$; location near major traffic way $r=0.334$; sofa $r=0.580$; windows $r=0.355$; sink $r=0.354$ and coffee maker $r=0.354$.

These 13 predictors indicate a significant level of relationship which influences the total number of users informally communicating. Other statistical calculations such as Regression and Step-regression were applied since some of these variables present high correlations with each other.

Test 1.4.2 - Regression was made between the total number of lounge users informally communicating and each of the physical design features to investigate P-value which indicates the significant level of variables in relation to the overall test. Table 7.8 indicates that only 4 predictors show a significant level where $P < .01$, vending machine and sofa expressed the strongest confidence at $P=0.000$; In addition, the location near major traffic way registered $P=0.001$; mail box with $P=0.002$; and the location near major traffic way with $P=0.001$.

These 4 independent variables with high confidence levels of P-value indicate strong significant variables in relation to the overall test.

Test 1.4.3 - Step-regression analysis was applied to the total number of lounge users informally communicating with each of the physical design features as shown in Table 7.10. It was found that 5 predictors with a significant level explain the dependent variables which include mail box with $R\text{-sq}=54.61$ and sofa with $R\text{-sq}=61.50-54.61=6.89$; location near major traffic way with $R\text{-sq}=82.29-61.50=20.79$; microwave with $R\text{-sq}=89.24-82.29=6.95$; and vending machine with $R\text{-sq}=93.62-89.24=4.38$. These 5 predictors explain 93.62% variation in the dependent variable.

As of this test level, it could be concluded that correlation showed 13 variables of physical design features highly correlated to the independent variable. While, Step-regression analysis shows a total value $R\text{-sq} = 93.62$ of the 5 independent variables predicting the total number of lounge users informally communicating. The result gives an overall indication that the study hypothesis is supported but the dependent variable must still be tested along with the other independent variables, using the same statistical procedures to obtain an overall study conclusion. The five predictors are classified as follows: a) Attractants: mail box, vending machine b) Behavioural prop - sofa c) Holding power: microwave d) Location on or near major traffic way.

7.4 Testing informal communication - Variety of lounge users activity with physical design features.

Testing Informal Communication represents Level-2 of the research design, *Figure 6.1*. The aim of this level is to investigate the relationship of a lounge user's behaviour and lounge physical features as against their total number and to each one

of them. The variety of activities will be tested in two steps: The first step is with the total number of physical design features and the other with each of the physical design features.

Each test includes Correlation, Regression and Step-regression analysis. Test 2.1.1 - Table 7.11, correlation analysis was made to investigate the relationship between a variety of activities and the total number of physical design features. The result showed that the total number of physical design features indicate a very weak relation with the variety of activities with $r = 0.141$. This relation is confirmed in Test 2.1.2 - Table 7.13 wherein the total number of physical design features showed insignificant value of $P > 0.10 = 0.139$ while $R\text{-sq} = 2.0$ indicated a weak relation in explaining the variety of lounge users activities with 2% predicting power. The second step, statistical application was made to investigate the correlation, regression and step-regression of a variety of activities with each of the physical design features. Test 2.2.1 - Table 7.12 indicated that out of the 29 hypothesised physical features, only 2 features showed a significant correlation level. These were 1-vending machine with $r = 0.741$ the relation of which is considered very strong and 2-lounge temperature with a moderate relation of $r = 0.325$. Regression analysis was made as of Test 2.2.2. - Table 7.14. The vending machine showed high confidence of the test with $P = 0.000$; existence of 'windows' with significant value of $P = 0.019$ and lounge temperature with significant value of $P = 0.045$.

In order to confirm all possible relations and predicting power between the variety of activity and each of physical design features, Step-regression was made as of Test 2.2.3. - Table 7.15. It was found that of 29 predictors only 5 predictors registered a significant level in predicting dependent variables. These were 1-vending

machine with $R\text{-sq} = 54.87$; 2-lounge temperature with $R\text{-sq} = 58.27-54.87=3.4$;
3-visual contact with $R\text{-sq}= 59.97-58.27=1.7$; 4-central location within the factory
with $R\text{-sq}= 63.21-59.97=3.24$ and 5-microwave with $R\text{-sq}=64.99-63.21=1.78$.

These 5 predictors explained the accumulative value of $R\text{-sq}= 64.99$ which gave a significant indication of explaining the main dependent variable of the study. It means that a vending machine accounts for 54.87% of variety of the lounge users activities to occur, lounge temperature is responsible for 3.4% of variety of the lounge user activities, visual contact explains 1.7% of the variety of activities, lounge central location within the factory marks 3.24% and microwave indicates 1.78% of the variety of lounge users activities that occur.

As a conclusion at this test level, all tests are significant with $P = 0.000$ and the main hypothesis is supported with a total $R\text{-sq}$ value = 64.99. The 5 predictors are classified as follows: a) Attractants - vending machine b) behavioural prop - sofa
c) Holding power - microwave d) Location - central location within the factory
e) Aesthetics - visual contact between passers-by and occupants.

7.5 Testing informal communication - Users density with organisation variables.

Users density includes the total number of lounge users and the total number of lounge users informally communicating where organisation variable includes organisation size, and the importance of informal communication.

Different statistical procedures were applied in order to find significant levels of relations among dependent variables, users density, and independent organisation variables.

The tests included correlation and regression analysis. These tests were presented in 4 steps. 1) correlation of the total number of lounge users with the size of organisation, 2) correlation of total lounge users informally communicating with the size of organisation and the importance of informal communication, 3) regression of total number of lounge users with the size of organisation and the importance of informal communication, 4) regression of total number of lounge users informally communicating with the size of organisation and the importance of informal communication.

Test 3.1.1 and Test 3.2.1 - Table 7.16, features the correlation of the total number of lounge users with the size of organisation and indicates a very strong significant relation with $r=0.907$. The importance of informal communication shows a moderate level of significance in predicting the increase of total number of lounges with $r = 0.343$.

Regression analysis was applied as of test 3.1.2 and Test 3.2.2 - Table 7.18. It revealed that the strongest predictor in explaining the total number of lounge users is the size of organisation with $P = 0.000$, $R\text{-sq} = 82.3$. This means that the size of organisation predicts 82.3% of total number of lounge users which indicates that as the size of organisation increases in terms of the number of employees, the chances of increasing the total number of workers using the lounge space becomes significant.

The second predictor is the importance of informal communication with $P = 0.000$ and $R\text{-sq} = 11.8\%$. This relation expresses strong confidence in the test since $P < 0.05$ and shows that the importance of informal communication predicts 11.8% increase in the total users of the lounge.

Therefore, as a conclusion on this level of tests, it is clear that the size of organisation and the importance of informal communication show significant predicting power in relation to the total number of lounge users with a total $R\text{-sq} = 94.01$. This means that both predictors take 94.01% of predicting power of the independent variable - informal communication - users density.

Other statistical analysis were used to investigate the correlation and regression between the total number of lounge users informally communicating with the organisation in terms of size, and the importance of informal communication.

As of Test 3.3.1 and Test 3.4.1 - Table 7.17 indicates the correlation between the total number of lounge users informally communicating with the size of organisation and the importance of informal communication. The result shows that the size of the organisation significantly predicts the total number of lounge users informally communicating with significant $r\text{-value} = 0.896$. The importance of informal communication shows a significant level too with $r = 0.544$ in predicting the increase of the total number of lounge users informally communicating.

In order to confirm these relations, regression analysis was applied as of Test 3.3.2, and 3.4.2 - Table 7.19. This indicates that the most significant predictor is the size of the organisation with $P = 0.000$ and $R\text{-sq} = 80.2$. This also means that the size of the organisation explains 80.2% of the predicting power and increases the total number of lounge users informally communicating.

Importance of informal communication shows a significant level of $P = 0.000$ and $R\text{-sq} = 11.8$. P-value indicates 100% confidence of the tests. Furthermore, R-sq value indicates that this predictor explains 11.8% of the reasons of the increase in the total number of lounge users informally communicating.

Based on this level of testing, the main study hypothesis proves that the total number of lounge users and the total number of lounge users informally communicating are affected significantly by the following variables: the size of the organisation and the importance of informal communication. The size of organisation gives interestingly high significant results both in the correlation and regression levels. It can be concluded that as the size of an organisation increases, the probability of the total number lounge users in terms of numbers and total lounge users informally communicating increases too.

In the case of the importance of informal communication, both cases revealed that the correlation value between the total number of lounge users and the total number of lounge users informally communicating was significant. Further, the prediction power of an increase in the total number of users in terms of their number and the total number of lounge users informally communicating in terms of interaction tends to occur. The overall tests based on Level 3 confirmed that the organisation variables as an independent variable affects and influences the main dependent variable of the study. As discussed in Chapter 6, organisation variable consists of different factors. These factors directly concern the focus of the study in relation to their numbers and their behavioural patterns. Another concern includes the size of an organisation in terms of the number of employees and the level of importance each organisation gives to both informal communication. Through the observations made,

it was found that an organisation's opinion as to the importance of informal communication varies according to different management styles.

7.6 Testing informal communication - Variety of lounge users activity with organisation variables

This section deals with testing the variety of lounge users activity with organisation variables (*Level-4*). Different statistical calculations were used to investigate the dependent variables of the variety of lounge users activity with organisational variables. Test 4.1.1, 4.2.1 in Table 7.20 correlates the analysis between the variety of activities with: size of organisation (in terms of number of employees), and importance of informal communication.

The size of organisation shows a very weak relation with the variety of activities since $r = 0.020$. The importance of informal communication also shows a very weak relation with the variety of activities with $r = -0.188$. Therefore, using the correlation analysis, neither of the 2 variables shows any significant level in correlation with the variety of activities among the lounge users.

The second analytical step was made using the Regression calculation in order to confirm existing relations between variables. As shown in tests 4.1.2, and 4.2.2 - Table 7.21. The regression of a variety of activities on the size of organisation, and the importance informal communication was tested. It was revealed that one variable showed insignificant level of confidence to predict the variety of activities which is the size of organisation with $P = 0.832$, $R\text{-sq} = 0.00\%$ and the informal social interaction with $P = 0.163$, and $R\text{-sq} = 1.8$.

However, the importance of the informal communication showed a significant level in predicting the variety of activities with $P = 0.047$ and $R\text{-sq} = 3.50$.

Application of Step-regression was made as Test 4.1.3, and 4.2.3 - Table 7.22. It revealed that only one predictor, *i.e.*, importance of informal communication, showed a significant relation with $R\text{-sq} = 3.5$. Through this level of statistical analysis it can be deduced that the variety of activities is not affected by the size of an organisation. The only relation that links the variety of activities and organisation variable is the importance of informal communication.

7.7 Summary

As of the test results, Level 1 of the research design in Figure 6.1 indicates that the total number of physical design features showed a significant value in predicting the increase in the total number of lounge users with $R\text{-sq} = 63.7\%$ and $P\text{-value} = 0.00$. It also revealed that seven of the hypothesised physical design features predicts the total number of lounge users.

Furthermore, the total number of physical design features showed significant levels in predicting total number of lounge users informally communicating with $R\text{-sq} = 99.3\%$ and $P\text{-value} = 0.00$. It also found that five physical design features are with significant relations in predicting the importance of informal communication.

Moreover, the total number of physical design features showed insignificant value in explaining the variety of lounge users activity with $R\text{-sq} = 2.00$ and $P = 0.139$. In relating the total lounge users activity with each of physical design features, five predictors are found with significant relations.

As for the organisational variable concerns, the size of an organisation and the importance of informal communication showed a significant predicting power in relation to the total number of lounge users with $R\text{-sq}=94.01$, while total lounge users informally communicating are affected significantly by the size of organisation and the importance of informal communication. Finally, the only predictor of the variety of lounge users activity in respect to organisation variables was found to be the importance of informal communication with $R\text{-sq}=3.5$ and $P=0.47$. Further discussion of the study findings will be undertaken in Chapter 9. The next chapter will descriptively illustrate each selected study test sample.

CHAPTER - 8

SPATIAL AND PHYSICAL STATUS OF THE RESEARCH CASE STUDY

8.1 Overview

Apart from selecting the study test sample, this chapter will deal with each selected test sample and give a descriptive analysis of each lounge space. This will be made with respect to lounge location in relation to the buildings production area and administrative area. Furthermore, visual accessibility will be examined as well as the degree of openness of the lounge space to production and administrative areas.

Environmental conditions will be discussed in terms of lounge temperature, humidity, daylight, noise...etc. Lounge size will be discussed for each case in relation to the total number of factory workers, and finally a list of physical design features of each lounge will be listed. This descriptive analysis will give a better understanding of the case study test sample in terms of conditions that surround its function.

As noted earlier, lounge space in this study refers to a space where refreshment facilities are available to serve factory workers at all levels of management levels.

8.2 Study sample number one - spatial analysis

The study sample number one referred to a National Food industry factory with a total work force of 171 workers. The working schedule is from 6:00 am to 6:00 p.m. with one and half hour break time.

As per researcher observation on study sample number one. It was found that the lounge space is located on one of the building corners adjacent to the production area with direct access, *i.e.*, door. The lounge is not visually connected either to the

production or to the administrative area. It is linked to the administrative area by a corridor approximately 10 meters long.

Environmental conditions of the lounge in respect to temperature, level of humidity, noise and daylight in general terms are under control and comfortable. For instance, temperature and humidity is controlled through the availability of air-conditioning units, since, outside temperature is very hot (35 to 45 degree centigrade) on average during the eleven months of the year.

Provision of daylight is not available in this lounge since there is no opening to outside because of the excessive heat radiation from outside, and the use of high tech screens in windows is associated with high cost. Due to its closed environment, the noise level is quite acceptable as per level of standard. The lounge is 42 square meter in size.

The researcher observed that the following physical elements were available in the lounge; dining tables and seats, refrigerator for cold drinks, coffee maker, catering services and seating sofas. On the other hand, the lounge lacks other hypothesised features such as a hot water boiler, mail box, microwave, reading materials, public telephone, audio visual fixtures and bulletin board.

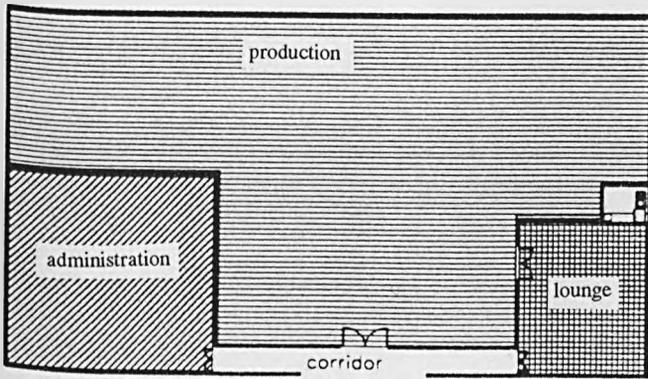
The average number of lounge users, during observation periods totalled to 16 workers, who were involved in different activities such as eating, drinking, smoking, relaxing and informally communicating. The introduction of a vending machine element resulted in an increase in the number of lounge users to an average of 31 workers. This increase could be due to the need for a refreshment facility (vending machine) in the factory which was not available in the production and administrative

area. The other probability is that workers were curious to experiment with the newly introduced high-tech machine.

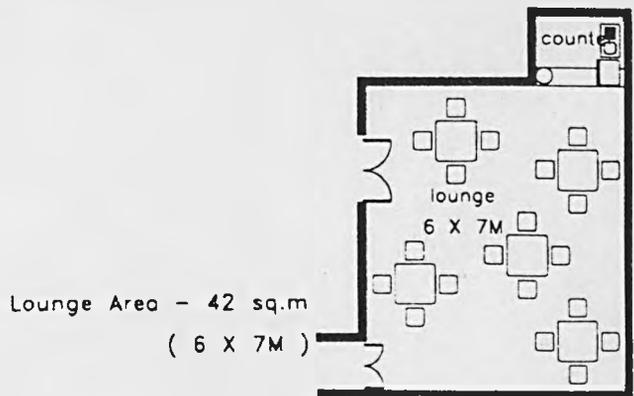
However, since there was no clear cut justification or measurement, the researcher did another eight observations through different days in weeks. It was found that the number of users increased before the introduction of the vending machine element. It was predicted that the use and function of this element was the strength behind the increased number of users which gives a positive sign in respect to study hypothesis.

Figure 8.1 illustrates a diagrammatic sketch of the factory building and lounge space settings.

LOCATION - 1



FACTORY PLAN (DIAGRAM)



Lounge Area - 42 sq.m
(6 X 7M)

LOUNGE PLAN

8.3 Study sample number two - spatial analysis

The study sample number two referred to the Al-Sunbolah Factory with 310 total work force, and a working day from 7:00 am to 7:00 p.m. with one and a half hour break time.

This is a larger manufacturing firm than sample one. The lounge space is located on one side of the building, *i.e.*, not centrally located, with direct access to the production area by means of doors. It is not visually accessible to the production or administrative area. It is connected with the administrative area through a corridor 15 meters in length.

Therefore, the lounge could be rated as an accessible space to both production and administrative workers. Environmental conditions were found by the observer to be within average acceptable levels. The space is air-conditioned and artificially lighted and daylight was available due to the existence of a window opening. The lounge is relatively quiet since it is protected by isolated block walls from all sides of the premises. The existence of a window opening creates an opportunity to view landscaping areas surrounding the lounge. It gives a moderately pleasing atmosphere inside the lounge and permits daylight to penetrate the space.

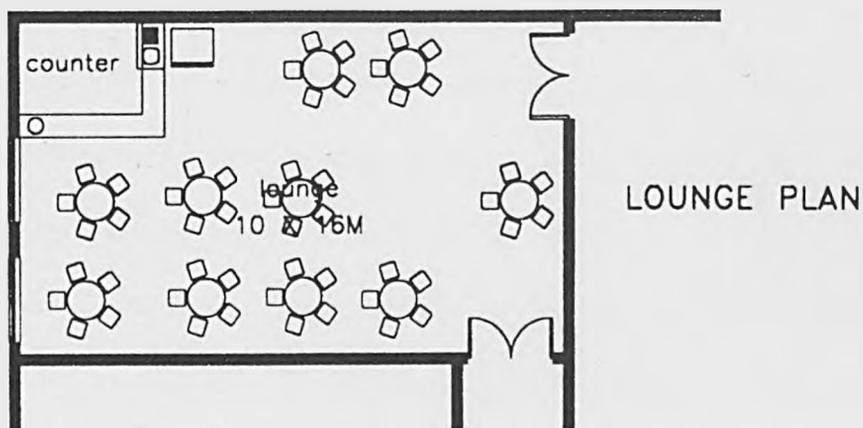
The lounge size is 60 square meters which was found to accommodate an average of 61 workers, and with the introduction of a vending machine element the observer noted an increase of total users to 78 persons.

As per the hypothesised physical features, some are found in the lounge such as dining tables and seats, refrigerator for cold drinks, comfortable sofa, catering services, and microwave. Moreover, the following features are not available: hot water

boiler, mail box, flip chart, reading materials, public telephone, video games and bulletin board.

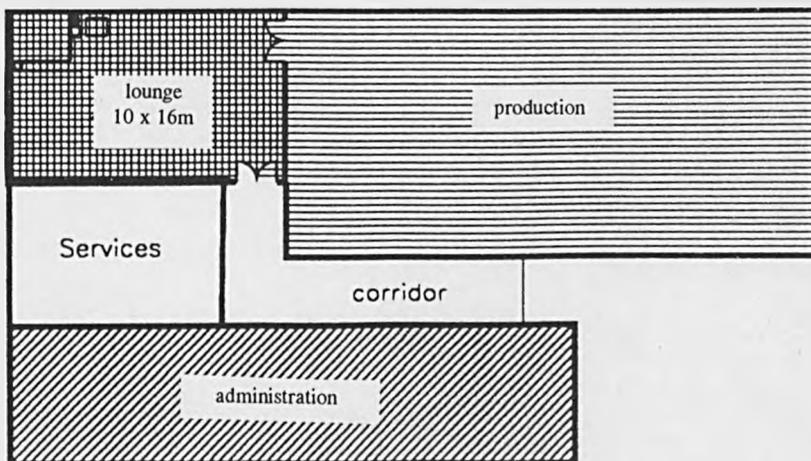
Figure 8.2 illustrates the factory diagrammatic sketch of the factory building and lounge space.

LOCATION - 2



Lounge Area - 160 sq.m (10 X 16M)

FACTORY PLAN (DIAGRAM)



8.4 Study sample number three - spatial analysis

The study sample number three referred to the Saudi Carton factory building with a total number of 120 workers. The working schedule is from 8:30 am to 4:30 p.m. with one and a half hour break time.

In this study sample, the lounge space was found across a pathway and not attached to the production or administrative area, however, it is located less than 6 meters distant from both functions.

Large openings to the outside were provided in the lounge showing pleasant landscaped areas of exterior space of the factory, and permitting daylight to penetrate in the lounge which gives a relatively pleasant atmosphere.

Since the lounge is detached from the production area it was found to be relatively quiet. Air-conditioning units are available with moderate temperature in general.

The lounge is twenty five square meters in size, and it was found that the average number of users of the lounge was fifteen persons at a time. Different hypothesised physical features were found including dining tables with seats, a hot water boiler, comfortable sofa, food catering services and a refrigerator for cold drinks. Furthermore, the lounge lacks the following facilities: a vending machine, coffee maker, mail box, flip chart, microwave, reading material, bulletin board, and audio-visual media fixtures.

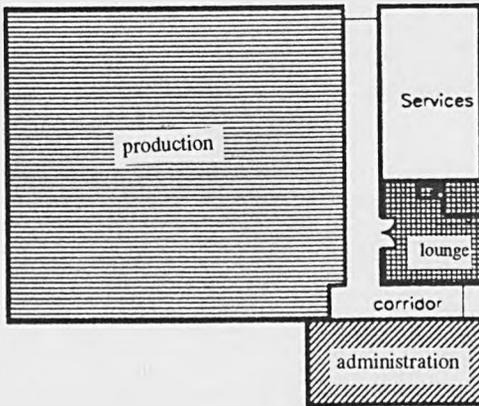
The introduction of a vending machine element increases the total number of users from fifteen persons to twenty two persons. The productive increase of lounge users in the event of vending machine introduction calls for the need to incorporate more physical features.

Users of the lounge are a mixture of blue-collar workers, and from the observations it appears that people come to the lounge not only to eat but to do other activities that might break the monotony of the production hall. Thus, users were engaging in the following activities: eating, drinking, smoking, relaxing, and communicating.

Figure 8.3 illustrates a diagrammatic sketch of the factory building and lounge space planning arrangement.

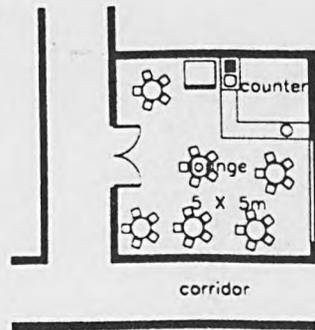
LOCATION -3

FACTORY PLAN



Lounge Area - 25 sq.m
(5 X 5M)

LOUNGE PLAN



8.5 Study sample number four - spatial analysis

The fourth study sample is the National Glass & Mirrors Company Limited. There are 137 factory workers which include blue and white collar workers. The working time schedule is from 8:00 morning to 5:00 evening with one hour break from 12:00 noon to 1:00 afternoon.

The lounge space was found in the building with a central location adjacent to the production and administrative areas. Even though it is attached, the lounge space is not open to either area, but is connected to both spaces by a corridor 6 meters long.

The lounge is 40 square meters with visual accessibility to the production hall by means of a glass opening. Since the lounge space is surrounded by function areas from all sides, no daylight was found, neither was there visual accessibility to the outside. The space is air-conditioned and noise was found to be within acceptable levels.

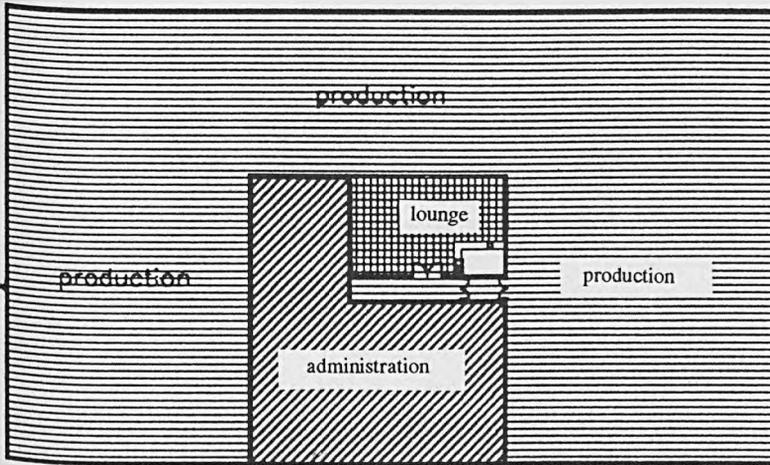
The average number of lounge users was 21 people before the introduction of a vending machine. The number substantially increased to 32 people right after the introduction of a vending machine element.

With respect to the availability of the hypothesised physical features, the following were found: dining table and seats, a comfortable sofa, refrigerator, coffee maker, catering service and microwave. Moreover, the lounge lacks the following: a vending machine, hot water boiler, mail box, flip chart, reading materials, audio visual media, and bulletin board. Moreover, the following activities were observed including: eating, drinking, smoking, relaxing, and informally communicating.

Figure 8.4 illustrates a diagrammatic sketch of the building planning arrangement.

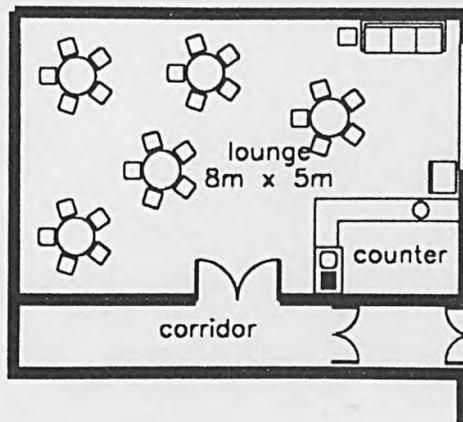
LOCATION - 4

FACTORY PLAN



Lounge Area - 40 sq.m (8 X 5M)

LOUNGE PLAN



8.6 Study sample number five - spatial analysis

This study sample was conducted in the National Automobile Industry Co. which employs 233 workers (blue and white collar workers). In this factory the working hours are from 7:00 morning to 4:00 evening with break-time of one and half hour everyday.

The lounge space is by far the largest among the study test samples conducted. It has a total area of 625 square meters, and is located in a central area of the factory adjacent to the production area, and connected by a corridor to the administrative area at a distance of 20 meters. The lounge is not visible to either area or even passers-by since it is enclosed with no opening to other building functions. Daylight was available through skylights.

The temperature of the lounge was found to be moderate since air-conditioned units were available and the noise level was found to be acceptable since solid noise insulated walls were constructed between the lounge space and the production area.

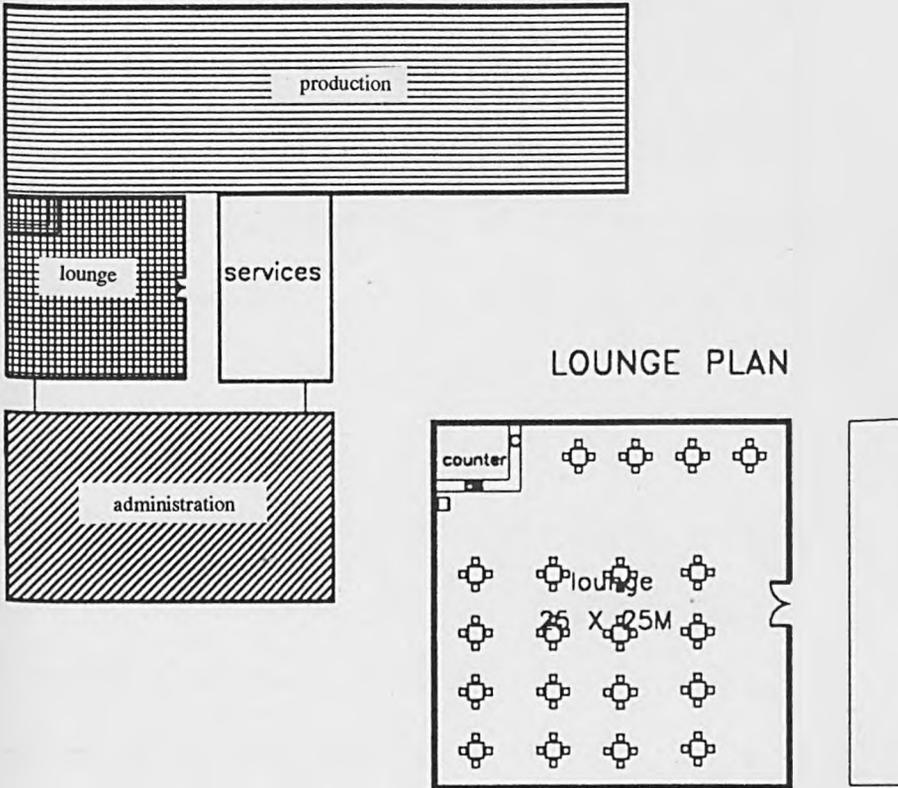
The following physical features were found in the lounge; dining tables with seats, refrigerator for cold drinks, coffee maker, hot water boiler, food service and microwave. Moreover, the following physical features were not available; a vending machine, seating sofa, mail box, flip chart, reading material, public telephone, bulletin board and audio visual media.

The introduction of a vending machine resulted in an increase of lounge average users from 63 to 85 persons. Most of the users were observed engaging in one of the following activities: eating, drinking, relaxing, gossiping and informally communicating.

Figure 8.5 illustrates a diagrammatic sketch of the factory building and its spatial arrangement.

LOCATION - 5

FACTORY PLAN



Lounge Area - 625 sq.m. (25 x 25M)

8.7 Study sample number six - spatial analysis

This study sample was conducted in Savola Snack Food Company. This factory is one of the largest snack food processing and manufacturing firms in Saudi Arabia. Factory employees total 444 workers (blue and white collar). The working day is from 8:00 morning to 4:30 in the afternoon with a break-time of one and half hours from 12:00 noon to 1:30 afternoon.

The total lounge space area is 500 square meters attached to the production area across a pathway. It is connected to the administration area by a corridor 20 meters in length. The lounge space is not visually accessible from the inside but it has wide openings with a glass facade to the outside where landscaped areas outside the factory building can be seen.

This visual accessibility added a new dimension to the space and a pleasant atmosphere. The lounge space is air-conditioned, therefore, the temperature tends to be moderate. The noise level is considered acceptable since the lounge is separated by noise insulated partition from the production hall and other factory services areas.

As per the physical design features, the following features were found in the lounge; dining tables with seats, seating sofa, refrigerator for cold drinks, coffee maker, catering services and reading materials. Furthermore, some physical features were not found during the observation as follows: a vending machine, hot water boiler, mail box, flip chart, and microwave. However, upon the introduction of a vending machine the number of lounge users increased from 175 to 200 people.

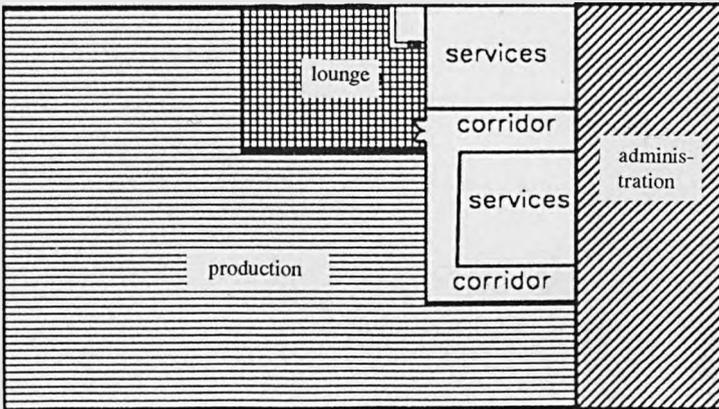
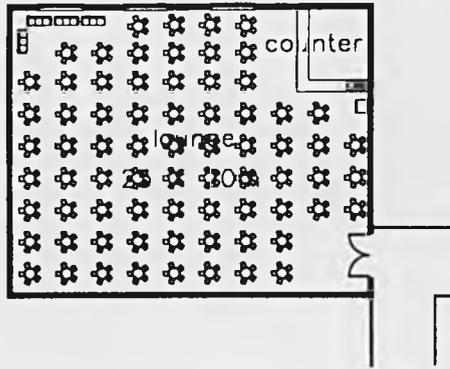
The following activities were observed in the lounge: eating, drinking, reading, smoking, relaxing and informally communicating.

Figure 8.6 illustrates a diagrammatic sketch plan of factory building activities.

LOCATION - 6

Lounge Area - 500 sq.m (25 x 20m)

LOUNGE PLAN



FACTORY PLAN

8.8 Study sample number seven - spatial analysis

Saudi Cable Company is the seventh study test sample categorised as an electrical industry. The factory employs the largest number of workers among the selected study test samples with 1002 employees (mixture of blue and white collar). The working time schedule is from 7:00 morning to 4:00 evening with a one and half hour break from 12:00 noon to 1:30 afternoon.

The lounge space is large with an area of 400 square meters, and located centrally between the administrative and production areas. It is connected to factory functions by corridors 5 meters distant from the administrative area and 15 meters distant from the production area. It has no visual accessibility to inner spaces of the factory. The wide glass facade of the lounge to an outside landscaped area gives the space a pleasant atmosphere and allows daylight to penetrate inside.

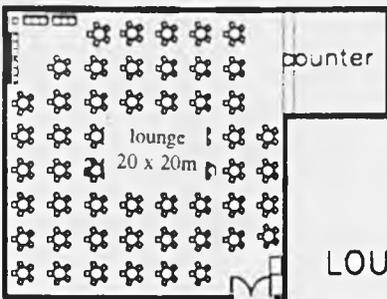
The temperature of the space is well controlled by air-conditioning units and the noise level was acceptable since it is protected by partition walls from other functions of the factory.

Out of the physical features being observed the following features were found present in the lounge; dining table and seats, refrigerator for cold drinks, hot water boiler, catering service, microwave and bulletin board. Other features which were not available include: a vending machine, mail box, flip chart, and reading materials. Moreover, the following activity of the lounge users were observed: eating, drinking, reading, smoking, relaxing and informally communicating.

Figure 8.7 illustrates a diagrammatic sketch of the factory building plan.

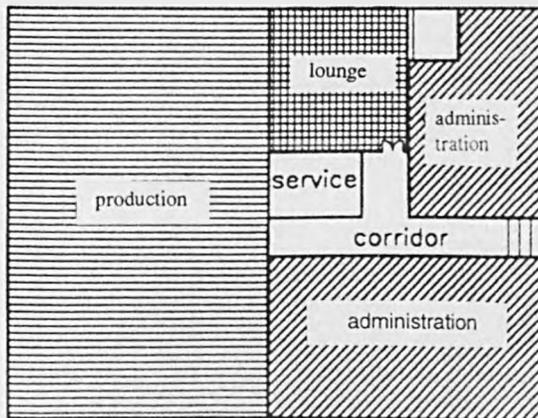
LOCATION - 7

Lounge Area - 400 sq.m (20 x 20m)



LOUNGE PLAN

FACTORY PLAN



8.9 Summary

This chapter has illustrated each of the study test samples with regard to their sizes, locations, visual accessibility, and environmental conditions as well as the presence and absence of the study hypothesis physical features.

In summary, all tested lounges are similar in terms of their original function which is the provision of food and refreshment services for factory workers. It was found that the basic design features of lounge spaces were available in all selected lounges, and the activities practised by the lounge users were relatively similar. Furthermore, it was found that the introduction of a vending machine element encouraged the workers to the lounge. It should be noted, however, that these increases could be the result of curiosity of workers to see this new element in the lounge or perhaps it could be the machine's function. The observer could not actually measure this act except by counting the number of users as it was intentionally meant not to ask workers about their feelings so that other factors of observation would not be affected in terms of workers change of behaviour.

However, the next chapter will discuss more of the study test samples in depth by using analytical methods of correlation, regression, and step-regression analysis.

CHAPTER - 9

RESEARCH FINDINGS AND IMPLICATIONS

9.1 Overview

This research study was formulated to provide a better understanding of the impact of the provision of physical design features on informal communication, established within support facilities in a manufacturing setting. It was also conducted to serve as a springboard to draw up specific design guidelines of gathering spaces in factory buildings. Therefore, it is hoped to aid facility managers and factory designers to adopt the guidelines in a way that supports manufacturing organisational objectives.

The other dimension in conducting this study is to compare findings with Campbell & Campbell's (1988) study conducted in an educational setting in the United States of America. It is aimed to provide the first step to generalise findings towards the influence of the provision of physical design features on informal communication.

The first section of this chapter will introduce a descriptive illustration of the study objectives. The second section will present the summary of the research findings in which correlation, regression and step-regression values are illustrated. The third section will discuss the interpretation of the research findings while the next sections will deal with research limitations and considerations. The implications for industrial organisation managers and factory building designers will also be discussed.

9.2 Description of study objectives

This study aims to investigate the impact of physical design features provision on informal communication in factory lounge settings. Physical design features were categorised into 6 classifications as follows: 1-attractants, 2-behavioural props, 3-holding power elements, 4-location, 5-aesthetics and 6-climate. The objective of the research was drawn up to provide a parallel study in an industrial setting to the study conducted by Campbell and Campbell (1988) in an educational setting. It aims to examine the link between the elements of physical environment and informal communication.

Different studies have shown the link between organisational commitment, satisfaction and work performances with informal communication, while few studies conducted have shown the link between environmental supports and informal communications. This was remarked on by Campbell & Campbell (1988)...

*.virtually no empirical studies have been conducted that address person-environment relationships in lounge settings. Similarly, no studies have been located that would provide a behavioural basis for design guidelines specific to lounges..*¹

Campbell and Campbell (1988) suggested that the results of their study may be generalised to research and development organisations with relatively little trepidation. However, to make further generalisation would be hazardous without conducting similar research in traditional business organisations.²

Furthermore, the first published study on strategic decision making in both private and public sectors of organisations in Saudi Arabia indicated an

increasing need to improve different communication channels and promote the participation of employees in decision making processes through an overall process of decentrali-sation. The study was participated by 127 government officials and 139 private sector executives. It revealed the need for improving the administrative bureaucracy by simplifying work procedures and requirements such as clarifying rules and regulations, specifying the roles and authorities, improving the chain of communication, speeding up the process of making and implementing decisions, improving employee productivity and enhancing their level of satisfaction, commitment, loyalty and public spirit.

Industrial organisations in Saudi Arabia are at a developing stage. As part of the Sixth development plan of Saudi Arabia, the government called on the private sector, both commercial and industrial, to support the overall economy of the country.³ Therefore, research and studies need to utilise the private sectors in order to upgrade the level of productivity and performance of these organisations.

This study was conducted among seven industrial firms in Jeddah, Saudi Arabia all of which were privately-owned companies. The selection of these factories was based on a pilot study of available factories in Jeddah. Lounge space was the primary factor in the selection of the case study, factories without lounge spaces were eliminated. One of the main purposes of selection was to find factories meeting the study requirements. It covered different industrial sectors including the food product industry, paper products industry, furniture industry, chemical industry, building and decoration industry, metal industry, wooden industry, fabricated metal industry and textile industry.

of these selected organisations showed the different characteristics best described by the humanistic theory in terms of the need for interpersonal relations among factory workers. Most workers who participated in this study were non-Saudis.

9.3 Summary of research findings

The study analysis of the research findings was presented in Chapters six and Chapter seven. Chapter six aimed to formulate an overall research design indicating different methods of locating the study test sample, the methods of data collection and tools of measuring informal interaction and physical elements. Factory lounges were carefully selected in a way that corresponded to the research needs.

Findings:-

(1) The field study was conducted in Jeddah City, Saudi Arabia which was chosen for its strategic location as the largest seaport in the Kingdom connecting local industries to global markets. Moreover, Jeddah has the highest industrial development growth rate in the Kingdom with nearly 3.1 % increase in the number of factories per year and 1.7 % annual increase in the number of employees.

(2) Seven out of 112 factories in Jeddah City were selected to be the subject of the research study sample. These were the (a) Saudi Cable Company with 1002 employees (b) Savola Snack Foods Co. with 444 employees (c) Al-Sunbolah Factory with 310 employees (d) National Automobile Industry with 233 employees (e) National Food Industry Co. with 171 employees (f) National Glass factory with 137 employees and (g) Saudi Carton factory with 120 employees.

(e) National Food Industry Co. with 171 employees (f) National Glass factory with 137 employees and (g) Saudi Carton factory with 120 employees.

(3) A research design diagram was made (Fig. 6.1) in order to illustrate the process of applying the problem stage of the research.

(4) There were 3 sets of variables used in the research design diagram: one dependent variable and two independent variables:

(4.1) The dependent variable in this study referred to informal communication (4.2) The independent variables referred to a) physical design features and b) organisation.

(5) Informal communication as a dependent variable is measured through: (A) density which includes (A-1) the total number of lounge users and (A-2) the total number of lounge users informally communicating; (B) variety of lounge user's activities.

(6) Measures of the total number of lounge users were obtained through direct observation of lounges each time an observation was made.

(7) Measures of the total number of lounge users informally communicating were obtained through direct observation of each lounge tallying the total number of lounge users involved in informal communication.

(8) Measures of the variety of lounge users activity were obtained through a behavioural checklist wherein each of the 112 observations were made for all lounges registering the type of activity that lounge users were practising.

(9) Measures of physical design features (first independent variable) were obtained through the hypothesised physical design features checklist wherein each

inspection of the physical design features was scored according to its presence or absence.

(10) The second independent variable (organisation variables) was measured using two sub-variables, namely (a) organisation size (total number of workers) (b) the importance of informal communication (that each factory management conceived).

(11) Measures of organisation size were obtained through interview with every organisation's head giving the total number of factory workers.

(12) Measures of the importance of informal communication were obtained through interview with each factory management head. The head of the factory was asked by the researcher to rate the general importance of informal communication among factory workers, from the organisation's point of view and not the head of the factory's personal point of view.

(13) All selected case studies chosen had similar main characteristics in terms of management style, cultural sector and social background. All activities were practised indoors and all labourers were males.

(14) All selected study lounge spaces were accessible to factory workers.

(15) Each lounge was observed 8 times without the introduction of a vending machine element and another 8 observations with the introduction of a vending machine. This was done in order to evaluate the changes that may occur among a user's density and behavioural patterns with the provision of a new physical element.

Chapter seven aimed at testing the study hypothesis on incorporated study variables. It also aimed at developing an overall model describing the impact of

physical design features provision in supporting informal communication in an industrial setting.

Four levels of statistical analyses were made to indicate the relationships between the dependent variable study and independent variables.

Level 1 was designed to test the relationship of informal communication with physical design features. This level was divided into 4 tests; (A) the relationship of the total number of lounge users with the total number of physical design features.(B) the relationship of the total number of lounge users with each physical design features (C) the total number of lounge users informally communicating with the total number of physical design features (D) the total number of lounge users informally communicating with each physical design feature.

Level 2 was designed to test the relationship of variety of activity with physical design features. This level is divided into 2 tests; (A) variety of activity with total number of physical design features and (B) variety of activity with each physical design feature.

Level 3 was designed to test the density with organisation variable. This level was divided into 2 tests: (A) the total number of lounge users with organisation size, and importance of informal communication. (B) total lounge users informally communicating with organisation size, and the importance of informal communication.

Level 4 was designed to test the variety of activity with organisation variables. This included testing the variety of activities with organisation size, and the importance of informal communication.

(16) Correlation, Regression and Step-regression statistical analysis were applied to test the study incorporated variables and indicated the following findings.:

16.1 - Total number of lounge users was significantly affected by the following independent variables. (Table 9.1)

16.1.1 organisation size with $R\text{-sq} = 82.32$ among organisation variable

16.1.2 bulletin board with $R\text{-sq} = 5.46$ as holding power elements among physical design feature

16.1.3 vending machine with $R\text{-sq} = 5.33$ as attractants among physical design features

16.1.4 hot water boiler with $R\text{-sq} = 0.92$ as holding power among physical design features

16.1.5 sofa with $R\text{-sq} = 1.24$ as behavioural props among physical design features

16.1.6 cross pathway with $R\text{-sq} = 0.25$ as location factor among physical design features

The remaining physical design features and organisation variables did not show any significance in predicting the total number of lounge users.

16.2 - The total number of lounge users informally communicating is found with significant relationship with the following independent variables:

16.2.1 organisation size with $R\text{-sq} = 80.21$ among organisation variables

16.2.2 mail box with $R\text{-sq} = 6.96$ as attractant among physical design features

16.2.3 vending machine with $R\text{-sq} = 4.91$ as attractant among physical design features

16.2.4 sofa with $R\text{-sq} = 0.51$ as behavioural props among physical design features

16.2.5 food service with $R\text{-sq} = 0.94$ as holding power among physical design features

16.2.6 total number of physical design features with $R\text{-sq} = 0.66$

16.2.7 location near major traffic way with $R\text{-sq} = 0.59$

All other independent variables including physical design features and organisation variables did not show any significant value.

16.3- The variety of activities were significantly influenced by the following:

16.3.1 vending machine with $R\text{-sq} = 54.87$ as attractant among physical design features

16.3.2 visual contact with $R\text{-sq} = 4.4$ as aesthetics among physical design features

16.3.3 moderate lounge temp with $R\text{-sq} = 3.4$ as climate factor among physical design features

16.3.4 microwave with $R\text{-sq} = 2.6$ as holding power among physical design features

16.3.5 importance of informal communication with $R\text{-sq} = 2.45$ as organisation variable

16.3.6 central location with $R\text{-sq} = 0.6$ as location factor among physical design features

All the remaining independent variables which include physical design features and organisational variable did not show any significant relations.

16.4 - Among the 29 hypothesised physical design features, 11 features were found with a significant relationship to the main dependent study variable. These are:
(see Table 9.4)

16.4.1 vending machine

16.4.2 mail box

16.4.3 sofa

16.4.4 bulletin board

16.4.5 food service

16.4.6 hot water boiler

16.4.7 microwave

16.4.8 location at cross pathway

16.4.9 location on or near major traffic way

16.4.10 central location

16.4.11 visual contact between passers-by and occupants

16.5 - Informal communication was found to have a significant relationship to organisation size and the importance of informal communication. *See* Tables (9.5, 9.6).

16.6- The eleven physical design features which were found to have a significant relationship with the dependent variable were classified as:

16.6.1 - Attractants which include:

- 1-vending machine
- 2-mail box

16.6.2 - Behavioural props which include:

- 3-sofa

16.6.3 - Holding power which includes:

- 4-bulletin board
- 6-hot water boiler
- 5-food service
- 7-microwave

16.6.4 - Location which includes:

- 8-at cross pathway
- 9-on or near major traffic way
- 10-central location within the factory building

16.6.5 - Aesthetics which include:

- 11-visual contact between passers-by and occupants

(17) It was found out that the number of lounge users increased dramatically when a vending machine is introduced. (Table 9.2)

(18) Based on the observations of sample study test settings, lounge 1, (1-18 National Food Industry Company) showed that the average number of lounge users based on the first 8 observations was 16 persons which rose to 31 persons, 93.75 % level of increase when a vending machine was introduced. (Table 9.2)

(19) Lounge 2 (1-21 Al-Sunbolah Factory) showed that the average number of lounge users based on the first 8 observations without the use of vending machine was 61 which rose to 78 persons, marking a 27.9 % level of increase, with the introduction of a vending machine. (Table 9.2)

(20) Lounge 3 (2-12 Saudi Carton factory) showed that the average number of lounge users based on the first 8 observations without the use of vending machine was 15 and another 8 observations with the introduction of a vending machine registered 22 people giving a 46.7 % level of increase. (Table 9.2)

(21) Lounge 4 (4-23 National Glass factory) showed that the average number of lounge users based on the first 8 observations without the use of vending machine was 21 and in the next 8 observations with the vending machine was 32, giving a 52.4% level of increase. (Table 9.2)

(22) Lounge 5 (6-10 National Automobile Industry Company) showed that the average number of lounge users based on the first 8 observations without the use of a vending machine was 63, and in the second 8 observations with the introduction of the vending machine was 85 or a 34.9 % level of increase.(Table 9.2)

(23) Lounge 6 (1-16, Savola Snack Food Company) showed that the average number of lounge users based on the first 8 observations without the use of a vending machine was 175 and in the second 8 observations with the introduction of vending machine was 200 giving a 14.3 % level of increase. (Table 9.2)

(24) Lounge 7 (9-1 Saudi Cable Company) showed that the average number of lounge users based on the first 8 observations without the use of a vending machine was 276, and in the second 8 observations with the introduction of the vending machine was 358, giving a 29.71 % level of increase. (Table 9.2)

Therefore, Table 9.8 presents a list of significant predictors that were found to be enhancing the level of informal communication of the study independent variable.

Table 9.8 Conclusion of study findings

DEPENDENT VARIABLES	INFORMAL COMMUNICATION
Physical design features	A- Attractants: 1-vending machine 2-mail box B- Behavioural props: 3-sofa C- Holding power: 4-bulletin board 5-food service 6-hot water boiler 7-microwave D- Location: 8-at cross pathway 9-on or near major traffic way 10-central location E- Aesthetics: 11-visual
Organisational variables	1- Size of organisation 2- Importance of informal communication

9.4 Research interpretation

Findings of the research showed that the study hypothesis was supported. Statistical results show that there is a significant relationship between physical design features and lounge users and levels of informal communication among lounge users. As a vending machine element was introduced, the number of lounge users increased. Apparently, the number of users showed positive relations between the different lounge features and behavioural patterns. Therefore, as the users increased in number, the interaction and informal communication attitudes increased too.

The findings also showed consistent results with Campbell and Campbell's (1988) study findings in the sense that greater use of space is related to the things that attract people, hold people and support informal communication.

Direct observation experiment showed that the use of a vending machine as part of the physical design features dramatically increased the attractants and holding power of the lounge. Table 9.2 showed a comparison between the first eight observations without the influence of a vending machine versus that of 8 observations with the influence of a vending machine element. The test was applied to each selected lounge and was assumed that all other possible variations in the 2-step observations were constant in as much as the observations were both done in the same factory, to the same workers, same lounge spaces and with other similar environmental features.

The researcher took a further step in analysing the different relations of all assumed levels of informal communication in terms of density of users and variety of

activities. Total users of lounge space were primarily predicted by different physical design features and organisational variables in density level.

The aim of this study was to find what attracts people to the lounge space and what physical elements motivate them to socialise and what physical elements determine their behavioural patterns. Three levels of informal communication variables were tested with physical design features and organisational variable to investigate elements affecting and predicting the total number of lounge users, social patterns of the users and variety of their activities.

Holding power elements were found to have significant predicting power to influence an increase in the number of lounge users. Similarly, behavioural props and location show significant levels of prediction power on the number of lounge users. The following elements allow the users to establish channels of informal communication: bulletin board, vending machine, hot water boiler, sofa and location at cross path-way. It was noted that all selected physical features in the study were assumed to be a desirable feature wherein the employees found a fulfilment of what seemed to be lacking in their work sections, *i.e.*, production room, administrative offices.

It was also found out that the size of organisation has significant prediction power over the increased number of lounge users. The researcher applied further statistical analysis on the total number of lounge users and found out that all six features indicated significant relations. Their importance was sequentially recorded as follows: the organisation size (strongest predictor), bulletin board, vending machine, hot water boiler, sofa and location in cross pathway (lowest prediction)

Other variables were found with significant prediction power among lounge users informally communicating, which relate to organisation variables, namely, organisation size, promotion of informal communication and the overall total number of physical design features.

Another step taken was to investigate the prediction power of the variety of activity among lounge users in respect to physical design features and organisational variables. It was found that the holding power element has the most significant prediction power categorised by a vending machine and microwave elements. This was followed by the aesthetic element emphasising the visual contact with passers-by, and climate element which is the lounge temperature. The fourth and last element is location which refers to the central position of the lounge space within the factory building.

The total number of lounge users informally communicating and participating in a variety of activities shows strong numerical evidence that relates to eleven physical design features existing in each lounge as well as organisation variables. The study showed that these physical features were similar in characteristic to those deduced by Campbell & Campbell's (1988) study on educational lounges. The eleven physical design features as per Table 9.3 & 9.4 were: 1-vending machine, 2-mail box, 3-sofa, 4-bulletin board, 5-food service, 6-hot water boiler, 7-microwave, 8-location at cross pathway, 9-location in central position in the factory building, 10-location at major traffic way in the factory building and 11-visual contact between passers-by and occupants.

The findings of the study conclude that desirable physical features in an industrial lounge space are essential to initiate informal communication among employees.

Desirable physical design features can be defined as:

- a.) the elements existing in a lounge space that attract people, *i.e.*, vending machine and mail box.
- b.) the elements existing in lounge space that hold people.

Once an individual is attracted to the lounge space, any element which can hold him will indicate an opportunity and probability to interact. It was found that a bulletin board, coffee maker or hot water boiler were among the effective elements holding lounge users for some time next to others.

- c.) the elements that help support informal communication.

Once an individual is attracted to spend time in the lounge space, supportive elements of informal communication are needed such as comfortable seats and well arranged sofa in a way that conversation between each lounge users can be achieved.

Location was found to have significant prediction power in relation to the different levels of informal communication especially: (1) when the lounge is located in a central area in respect to the other departments and services; (2) when the lounge is located on or near major traffic ways within the factory building; (3) when the lounge space is located at a cross pathway.

The location factor is important in relation to the density of users of the lounge. It was found out that location is an important predictor of informal communication which is very similar to Campbell & Campbell's (1988) study conducted in University lounges. To this effect Campbell quoted that:

*“ location factors are particularly important in the success of an organisational space design to support informal communication.”*⁴

Organisational variables which include organisational size, and the level of importance in which informal communication is held by the organisation heads show significant levels in predicting informal communication will happen. This assumption was based on the numerical findings as a result of the statistical methods applied which include correlation and regression among study variables.⁵

9.5 Research limitations and considerations

The study was conducted in light industrial setting in Saudi Arabia. Findings of the study could be generalised to a degree in the light of the fact that there is a lack of other studies in conventional administrative offices in both the public and private sectors other than educational or industrial settings.

The findings of this research were obtained from seven selected factories. There were, however, some limitations which include unity of workers in relation to their social and cultural backgrounds because of the fact that the workers in the study were a mixture of races from different nations *i.e.*, middle east, far east and western nations. There were also limitations with regards to methods and tools of data collection which were obtained through direct observations.

Since the main focal point of this research was the connection between provision of physical design features and their influence on informal communication, the following considerations were taken into account in the selection of the samples: a) availability of lounge space in the industrial sector, b) availability of all departments including lounge space within the building and c) organisation style.⁶

9.6 Implications for researchers

Further research is needed to explore the effect of the provision of physical design features on informal communication patterns in traditional administrative offices both in private and governmental sectors. Further research should also freeze all possible variables which could affect levels of informal communication. The focus should be on the provision of physical design feature variables. It is also recommended that similar physical design features to those in Campbell & Campbell (1988) study as well as this study are used as a guide, so that findings can be generalised.

Further research should use similar methods of direct observation and interview. It is also recommended to conduct studies on the effect of management styles of informal communication among workers in industrial settings.

Other studies could be made to investigate further the impact of physical design features on levels of informal communication within working spaces and during working hours, since this research and Campbell & Campbell's (1988) study were made during off-task moments in non-productive spaces.

Moreover, further studies need to be done to investigate other possible elements that affect levels of informal communication in relation to quality of spaces, physical design features layout, administrative and social settings. Moreover, these studies needs to be conducted in office, manufacturing, and educational settings in Western, Middle Eastern, and Far Eastern cultural settings, in order to generalised the findings of the early contributors.

9.7 Implications for industrial organisation managers

Managers of industrial organisations are urged to understand the need for informal communications among their employees. Also, they should think of non-working areas in the workplace as a power for employees to interact informally, understand each other and communicate in a relaxed manner in order to diminish, if not totally eliminate, bureaucratic barriers and work fatigue. Once applied, informal communication will benefit the organisations as a whole in which workers will experience a better sense of belonging and greater job satisfaction could be achieved.

Managers should understand the different elements that influence informal communication among staff members and that the use of high-tech information media will not eliminate the need for social interaction in workplaces. This study has revealed that in all seven selected cases, managers were aware of the importance of informal communication as well as the importance of social interaction among their employees.

The interviews conducted with the seven factory managers were favourable. Four managers rated informal communication as an extremely important activity and three managers rated it as a very important element.

The lack of full management understanding on the importance of elements of the physical environment that affect directly or indirectly the employee's performance are attributed to the lack of adequate empirical research and studies regarding this matter. However, managers should understand that employees are human beings, differ from any machine. People need social life and that is why social interaction and informal communication channels should be facilitated through different elements, one of which is the provision of physical design features.

9.8 Implications for factory building designers

The role of the designers in support of manufacturing organisational goals and objectives is vital. They should plan spaces in association with support facilities of the core production process.

One of the definitions of the architecture discipline is that it is the art of providing spaces. Designers are urged to consider the provision of different design features within their design processes which would support organisation goals. Therefore close co-ordination between the designers and policy makers for an industrial organisation is very important so that the physical setting can be enhanced as well as influence the users towards the overall objectives of the organisation.

The results of this study have dictated certain design guidelines to designers in order to achieve the most desirable physical features which could support levels of informal communication and consequently support work performances. (Table 9.4) Ten design features were found significant in predicting the existence of informal communication activity among workers in lounge spaces within the factory buildings. These design features are:

- A) Provision of Attractant elements as:
 - 1-vending machine
 - 2-mail box

- B) Provision of Behavioural props as:
 - 3-sofas

- C) Provision of holding power elements as:
 - 4-bulletin board
 - 5-food service
 - 6-hot water boiler
 - 7-microwave

- D) Consideration of lounge location:
 - 8-at cross pathway
 - 9-near or on major traffic way
 - 10-central location within factory buildings

This study proved positively the connection between elements of the physical environment and informal communication. Factory building designers should benefit from such studies which relate the user's behaviour with the physical setting. In other words, designers are expected to look at the problem of factory building designs from four perspectives. First, to understand an organisation's objectives. This requires direct contact between the organisation's policy makers and the factory building designers team. Second, to understand the user's needs which requires an investigation of their socio-cultural background and their needs in respect to the use of spaces and its associated facilities. Third, to perceive the required spaces for different departments and their associated facilities. The last perspective is to combine the organisation's objectives with the user's needs and space requirements wherein the total space outcome will serve the organisation's overall work performance.

9.9 Summary

Physical design features and their relation to informal communication were explored in this study. The main hypothesis of the study was supported through the numerically significant values found in the study.⁷ Specific physical features are found to have significant predictive power to influence informal communication in industrial organisations.

This study is distinct from others in two ways; First, it reveals the link between elements of the physical environment and informal communication in the lounge space of an industrial setting. Second, a specific element of physical design features was found with a significant predictive power on informal communication. Because of the lack of other descriptive studies in industrial settings, the researcher provided the first step to generalise the hypothesis proving that the physical design features predict levels of informal communication within industrial workplace. Finally generalisation of this hypothesis requires further study in office, manufacturing, and educational settings in Western, Middle Eastern and Far Eastern setting. Other possible predictors of the level of informal communication also need to be studied, such as: quality of lounge spaces, and space layout patterns, in addition to administrative and social aspects of organisations.

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6. *see* Chapter 6 - Research methodology, Section 6.2
7. *see* Chapter 7 - Testing study hypothesis on incorporated study variables.

CHAPTER - 10

CONCLUSION

10.1 Overview

This chapter will explore the role of facilities management discipline on topics discussed in earlier chapters including organisational theories, communication theories, physical elements of the workplace and the study findings. An investigation of different issues related to the facilities management approach will be also undertaken.

The first section will give an overview of the evolution of organisational theories in connection to study findings and the role of the facility management approach. The second section will look at the evolution of communication theories and their connection to study findings and facilities management perspective.

The third section will deal with the physical elements of the workplace by illustrating the different views and ideas put forward in earlier theories and writings with reference to the study findings, from a facilities management view point.

The specific study findings, therefore will be discussed in the fourth section in relation to manufacturing workplaces and facilities management approach. The final section will deal with the investigation of the role of the emerging holistic approach of facilities management in organisation effectiveness and overall productivity.

10.2 Organisation theories development and facilities management

An in-depth investigation into human aspects of workers in workplaces began in the late 1940's and was introduced into organisation theories. In the early decades of organisations the isolation of workers was common practice. Management were more concerned with work tasks and productivity, neglecting the worker's welfare and human needs.

In the early 1960's, the systematic consideration in organisations had changed and shifted from macro theories to a more micro level as psychological theories of personality, motivation, perception, attitude formation, leadership, and group behaviour took hold.¹

The emergence of classical theories was dominated by Weber (1864) with his bureaucracy theory, characterised by high division of labour, high departmentation, unity of control, centralised decision making and limited communication channels.² This idea was followed by Fayol's (1841) functionalism theory of organisation. Fayol envisaged the idea of the subordination of individual interest to the general interest of organisations which represent an elaboration of bureaucracy principles.

Fayol's view of worker's dehumanisation led to the birth of the scientific management theory of Frederick Taylor (1911) which highlighted some behavioural issues of workers.³ Taylor's scientific management theory concerned human aspects in an abstract vision such as monetary incentives for workers, which were far beyond their human needs.⁴

The socio-technical system approach of Hawthorne (1930) viewed organisation as an interrelated process in both human and technical perspectives.⁵

The classical theories were followed by the concepts of 'humanistic theories'. In these, a more converging outlook of worker's well-being emerged. An example is Maslow's (1943) need-hierarchy theory, motivated by physiological and self-actualisation needs of workers.⁶ Furthermore, Herzberg (1957) formalised the two-factor theory wherein the hygiene and motivator needs of workers were emphasised.⁷

In this particular theory, Herzberg argued that negative feelings of workers in workplaces were associated with different factors, one of which is the working environmental conditions and interpersonal relationships at work.⁸

The need for interpersonal interaction in workplaces was brought to light by Homans (1974).⁹ The awareness of interpersonal interaction between workers in workplaces had been investigated directly and indirectly by a number of theorists such as Likert (1967) Argyris (1964) and McGregor (1957).

In summary, humanistic theories have drawn attention to the concern of human aspects of workers in general terms through their emphasis on group relations, and improving communication channels in organisations. The aspects influencing human interaction and informal communication were not specified by human theories, such as, elements of physical environment, but the importance of social issues for workers was emphasised.

Humanistic theories were followed by system theories which give a more focused view of factors in the workplace that affect worker's behaviour.¹⁰ In these theories organisations are considered as systems with integral parts. Each part is considered as an important element, and when, these elements are combined in a careful manner it will favour the whole organisation structure. For instance, Trist & Belforth (1951) proposals of the socio-technical approach, urge a balanced relationship

between human/social aspects of workers and the technological systems of the organisation.¹¹ This approach has been taken further by different theorists such as Burns & Stalker (1961), and Woodward (1965) looking at the social pattern of workers through lateral communication channels.

System theories have not explored workers physical environment but instead focused on issues of organisation structure, specifically the process of production and formal management structure. These views have been further developed by a new set of theories of Lawrence and Lorsch (1967) in which they explored the role of communication channels not only between departments of organisation but also between individuals.

Information processing was further highlighted by Galbraith (1972), who suggested some strategies to improve information processing between lateral units of an organisation.¹²

As new approaches developed, early concepts of bureaucracy and hierarchy were gradually diminished and the idea of workers as human beings started to emerge. For instance, Peters and Waterman (1982) recognised that workers needs should be treated with respect and dignity encouraging their freedom in the work-place as well as their entrepreneurial spirits, and viewing them as a source of quality and productivity in the organisation.¹³

Team work in a productive manner coupled with informal communication and interaction were the main concern of Waterman. Further concern was shown by Kanter (1989) by viewing the workplace as a fountain of social life in which it should serve worker's human aspects and needs to the extent that family commitments of workers should be looked at and considered.

The emergence of a learning and knowledge organisation approach have consolidated the previous views and concerns of workers well-being in workplaces. Learning organisation is about much more than performance measurement and appraisal, it stresses the process of creating, acquiring, and transferring knowledge through its principle assets which are their workers. It motivates people to interact and act as a team and to react as a whole learning unit.¹⁴

The process of team learning is viewed as a shared vision process rather than a personal vision, which requires an ongoing informal communication and interaction process, listening to each other so that new insights can be achieved.

The knowledge-based work force is helped by high-tech machines which collectively can formulate much more added value to organisations of the future. Intelligence, information and ideas are considered as the prime intellectual capital of new organisations.¹⁵

The effectiveness of an organisation is the sum of the effectiveness of different disciplines including effective workers, workplaces, environment and support services to core business. Therefore, the need for a comprehensive solution to organisation effectiveness can be best served through the most up-to-date knowledge which is the facility management organisation approach.

Facilities management is the process by which an organisation ensures that its buildings, systems and services support core operations and processes as well as contribute to achieving its strategic objectives in changing conditions. It focuses resources on meeting users needs to support the key role of people in organisations, and strives to continuously improve quality, reduce risk, and ensure value for money.¹⁶

The findings of this study assert that lounge spaces (one of the support facilities elements) are positively correlated with informal communication of factory workers, which in term addresses the issue of workers satisfaction and consequently better productivity and performance.

The added value of supportive facilities by means of an effective management approach in respect to organisational objectives could be best utilised by the facilities management approach. The ultimate use and integration of organisation resources is one of the main concerns of the facilities management discipline. All resources are seen by facilities management as related aspects of the organisation including strategic business plans, administrative processes and the building in its complex manner which inhabits different technologies with rising user expectation in respect to welfare, health and safety process.

Moreover, the facilities management approach is best fitted to the changing organisations of today and the future which can cope with market demands and rising technological prospects in the global sense.

10.3 Informal communication and facilities management

As discussed in chapter three there is evidence that informal communication has gained much more recognition in organisations through the evolution of communication theories. The early perception of communication referred to the technological models which Aristotle's rhetoric perceived, that is the one-way process where the sender of the message attempts to persuade the audience in a one-way formal communication.

By the mid 1900's, Shannon (1949) proposed a mathematical theory of communication where information exchange was developed to be a two-way process, that is, between the sender and receiver. Furthermore, Westley & MacLearn (1957) came up with the concept of two-way communication process which was developed to include feedback process with gatekeeper interference.

This particular development in communication is called the human behaviour model, unlike the technological models which ignored individual differences in respect of the sender and receiver. However, it also failed to support interpersonal communication process.

Further development showed the approach of a face-to-face communication process which was well illustrated by the human behaviour approach, but still communication in both human behaviour and technological approaches was seen as a statistical phenomena.¹⁷ Moreover, the interactive process of communication was explored by Berlo (1960) in which individual messages are not allowed to be in isolation. Berlo incorporated the presence of the five senses as part of the communication process.

The emphasis on horizontal communication came as a result of the emergence of the integration personnel concept of Lawrence & Lorsch (1967), in which, group lateral communication is emphasised, requiring a much more personal integration among members of the group.

This notion of group communication resulted in the development of the grapevine concept which was explored by Davis (1977).

The grapevine concept deals with informal communication patterns that spread information outside regular formal channels of organisations. Moreover, researchers

suggest that most grapevine information is accurate and much faster than formal communication channels.¹⁸

However, as the field of communication developed, interpersonal communication issues were also investigated further. Shaw's (1978) concept of the communication network argued that group efficiency is correlated to the structure of the communication network in an organisation. While Lewis (1980) investigated individual skills in respect of the level of communication process and Forsyth (1983) stressed on the decentralised network and suggested that decentralisation is more efficient when tasks are complex.

In early 1960, Roy D.F. saw the need for a work group with social interaction process which results in employees satisfaction and consequently contributes indirectly to organisation success. It should be noted here that the previous views of communication theories involved the subsidiary process matters of transmitter / message / channel and receiver efficiency.

The corporate communication approach emerged in the early 1990's, relating human aspects to corporate activities with respect to knowledge of communication theories and development of communication skills related to interpersonal, small group, and organisational effectiveness. In this approach, communication is viewed as a process rather than a simple information exchange. This notion of process involves all corporate dimensions including administrative, human and physical work place aspects.

Internal informal communication plays a much bigger role in the success of the communication process. This results in improved productivity and higher quality, reduced costs and increased levels of innovations which can be achieved in

organisations.¹⁹ For instance, a recent research survey evidencing 1000 UK organisations has shown that internal informal communication with respect to the employee relationship with managers and face-to-face communication in particular, are categorised as one of the most important activities for today's and future organisations which play a vital role in work performances.²⁰

Workers of future organisations, specifically in the manufacturing industry will be moving in team and group work processes rather than individually. Therefore, strong channels of informal communication are in demand, since work groups and teams are a collection of workers who cannot accomplish their interrelated tasks without strong interaction process, in which rules and norms can be fully investigated among members of the groups or teams.

Moreover, cohesiveness of work groups and teams are best achieved by direct and strong informal communication patterns in order to achieve greater satisfaction and better productivity performance among them. The learning and knowledge organisation approach is considered to be the latest in the field with much more emphasis on cohesiveness of work groups and teams because it is the central process in productivity and performance of job accomplishment.

Unfortunately, researchers have ignored the very important role of informal communication in organisations and left the field with a very limited number of studies. The endeavour made by Campbell & Campbell (1988) in their study of informal communication conducted in an American university, served as the catalyst towards the development of investigations.

However, offices and manufacturing workplaces have not been fully investigated in this respect. The concept of a total workplace as illustrated by Becker (1982)

needs to be further investigated in terms of quality and layout of facilities as well as the effect of administrative and social setting on workplaces.

This study focuses on one of the elements affecting levels of informal communication which is the provision of facilities. It discovered that in the manufacturing setting, gathering places are vital in providing the opportunity for informal communication process to take place. Furthermore, it was found that the provision of physical design features in support facilities spaces contributes positively to levels of informal communication by increasing the chances of interaction among workers.

Therefore, one can conclude that best utilisation of support facilities spaces as well as other core spaces in workplaces will affect overall performance. The balance of generic management skills, including core organisation aspects, space, environmental aspects, communication issues, and support services are best illustrated by the facilities management discipline which will play a major role in the future of 21st century organisations.

Facilities management is a key business discipline, when times are difficult in business, when there is increasing corporate restructuring and growing uncertainty, facilities management has become an area of substantial growth.²¹

Organisations of the future will not need a workplace as a shelter but need a value added approach to workplaces that best serve effectiveness and performance of overall organisations. Facilities management is concerned with a broad understanding of corporate mission and objectives. It views organisation as an accumulative integrated process achieves core business objectives in a coherent way..

Where there is a need for an effective workplace with its components of physical elements, environmental supports, information technology, and human

aspects to serve management needs, facilities management emerges as the best alternative.

10.4 Physical environment and facilities management

The physical environment in workplaces has an ultimate role in the predicting effectiveness of workers and therefore overall organisation. Effectiveness is defined by multiple criteria including individual performance and satisfaction, interpersonal communication, cohesion of work groups and the overall integration of the organisation.²²

For instance, physical environment plays an important role in respect to levels of interpersonal communication by its influence on the convenience or comfort of face-to-face conversation.

Informal communication by means of face-to-face interaction among workers regulates job satisfaction, which in turn contributes to organisational effectiveness.²³

Through the evolution of organisation and communication theories recognition of the role of the physical environment on organisation effectiveness and performance has emerged. Early theories of the 18th century, the 'feudalism theory' neglected the impact of physical environment on worker's productivity and viewed workers with discrimination and favouritism. Furthermore, classical theories in the mid 18th century and early 19th, perceived physical environment in its rigid perspective.

As in the case of Weber (1864) bureaucracy concept, no explicit place for the physical environment was made and instead implicitly supported the use of status

symbols.²⁴ In the case of Taylor's (1911) scientific management theory, supervision and visual accessibility of workers was the main concern.

Hawthorne's (1920) laboratory study represented a turning point in the history of the psychology of workplaces, in which, psychologists had been showing increasing interest in the influences of the physical environment on performance.

In summary, the above mentioned classical theories neglected human aspects of workers, predominantly dehumanising the workers, and in so doing, gave an impetus for the humanistic theories to evolve. These are classified as outgrowth of the human relations movement with two groups of ideas that have particular relevance to the workplace, including theories of job satisfaction and interpersonal relations.

Job satisfaction was addressed by Maslow (1943) and Herzberg (1959). Maslow stated that each person has a hierarchy of needs including needs for social relationships and personal growth. Furthermore, Maslow's approach had pictured the physical environment as satisfying basic needs for shelter and security.²⁵ On the other hand, Herzberg's theory of satisfiers and dissatisfiers depicted the physical environment as a dissatisfier in which workers gain satisfaction from things such as interesting work, autonomy, and social contact.

In these theories, interpersonal relationships are viewed as one of the different elements that potentially contribute to job satisfaction.²⁶ However, in respect to interpersonal relationships, Likerts (1961) linking-pin model is considered as the leading theory in respect to informal relationships among workers. Even though, Likert's theory had no overt role for the physical environment, it alerted the need to investigate interpersonal relationships in workplaces.

As an earlier theory of Homans (1950), the group theory, argued, that patterns of interpersonal interaction are associated with physical proximity among worker in which the physical environment creates opportunities for frequent interaction. Similar approaches were found in the preceding theories of Argyris (1957) and Mc Gregor (1957).

In summary, humanistic theories visualised worker's motivation associated with interaction, group satisfaction and human needs of workers. Moreover, group cohesiveness and job satisfaction were associated with the physical environment.

Further theories came after, named as system theories, in which specific emphasis was made on factors of physical environment that affect the way in which an organisation operates. System theories have provided a much more focused view on interpersonal relationships in respect to physical environment. These relations were illustrated by different theorists as Trist & Bemforth's (1951) socio-technical theory, Burns & Stalker's (1961) mechanistic and organic theory, and Woodward's (1965) function theory.

The socio-technical approach dominated the system theories of organisation, it emphasised the importance of the fit between technology and social structure of an organisation. Seemingly, it treated the physical environment as part of the technological components of an organisation.²⁷

Following the system theories, numerous theories were formulated which shaped organisation dynamic theories, including Lawrence and Lorsch (1967), Galbraith (1972), and Ouchi (1981). These theorists viewed organisation as a dynamic process that involves integration mechanisms of different parts of the

organisations through enhanced communication channels between social and structural components. Furthermore, information processing became as one of the driving elements in the success and effectiveness of organisation. Informal communication have been realised in these theories as a major aspect in promoting lateral communication among groups of workers.

Further emphasis on group and team work was given by different writers and theorist including Peter & Waterman (1982) with their entrepreneurship concept and Kanter's (1989) post-entrepreneurship organisation, in which emphasis was placed on team work enhancing the informal channels of communication.

Learning and knowledge organisation was introduced by Senge (1990), Drucker (1992), and Handy (1994), in which, interaction and informal communication are seen to be an essential components in the learning process and knowledge sharing of organisations.

The physical environment is one of the factors that contributes to the success of informal communication processes within a workplace. Therefore, the best utilisation of the physical environment will result in greater efficiency of workers and organisations. For instance, this study findings indicate that the provision of desirable physical design features in the industrial workplace within support services, promotes chances of informal communication among workers. It should be noted that physical design features are not the only predictor but one of different elements in organisations which contribute to their overall organisational effectiveness.

Therefore, the holistic approach that provides an interrelated connectivity between the complex aspects of organisations of today and the future can be best illustrated by the facility management approach.

Organisations of the late 1990's and the future are becoming much more complex than they used to be in the past. With facility management discipline, organisations will participate in a holistic process driven by external forces which include global market competitiveness, economical and cultural aspects. Furthermore, internal aspects of organisations are becoming complex, especially with the increased needs of knowledgeable workers and strict rules and regulations of workers well-beings.

With respect to the physical environment, facilities management plays a vital role in ensuring the best and effective utilisation of these elements in order to meet overall organisational objectives through the set-up of responsible facilities planning that can support corporate goals and objectives.

Value is added to an organisation at the workplace through the provision of services in the most efficient and effective way by the development and management of quality managed systems. It is also added through the establishment of guidelines and service levels and at the policy level through the development of a strategy and framework within which to deliver services.²⁸

10.5 Research findings and the industrial workplace

The industrial workplace of today and the future is complex with a long list of factors affecting its function. One of these is physical design features which can serve a vital role in the success of manufacturing processes if utilised according to organisational goals and objectives.

As discussed earlier in Chapter two, through the evolution of organisation theory, there has been a grown recognition for the need for team and group work in workplaces. Learning and knowledge organisation of today's management is characterised by strong interactive relations among the work force.

The knowledge organisation of the future is centred on information, not only in terms of acquisition but also in distribution of information, internally as well as externally. Internal information exchanges are practised within organisational structure in workplaces; whereas external information exchange involves organisational relation to others local or global markets.

The physical elements of a manufacturing workplace play a substantial role in facilitating the process of internal information exchange. Lateral communication patterns within organisations are becoming much more important, particularly face-to-face communication, which is referred to as informal communication process. Face-to-face exchange of information leads to successful team work and group functions, the building up of new ideas and innovations which can be shared and further investigated.

The factory of the future is forecasted by writers and theorists as a 'flotilla' consisting of modules centred around a stage in the production process.²⁹ Each module will have its own control, though, it will function within the overall organisation's command and control with interrelated processes. Many manufacturing firms today have envisioned this approach including Westinghouse U.S. plant, Asea Brown Boveri's robotics plant in Sweden, as well as others in Japan.³⁰

Drucker (1992) argued that.....

*“traditionally, manufacturing businesses have been organised in series with functions such as engineering, manufacturing, and marketing as successive steps. These days, that system is often complemented by a parallel team organisation - which brings various function together from the inception of a new product or process project. If manufacturing is a system, however, every decision in a manufacturing business becomes a manufacturing decision. Every decision should meet manufacturing’s requirements and needs and in turn should exploit the strengths and capabilities of a company’s particular manufacturing system.”*³¹

The manufacturing workplace is changing and will continue to change, it is not anymore a mechanical process of production, it is becoming a homogenous process that involves, in addition to the assembly line process, the integration and interaction of people with greater freedom to innovate and experiment in a productive manner.

There is much more to conceive as Burnes (1994) stated ...

*“the future type of organisations is likely to be one where people will be given greater freedom to innovate and experiment...where people will be given greater control over their area of the business.”*³²

Moreover, the value added approach in the manufacturing workplace is the driving force of the late 1990’s and future factories. One added value can be accomplished through supportive facilities of the core production process. The provision of gathering places for workers is part of supportive facilities, and added value could be achieved by provision of physical design features which can elevate chances of informal communication process among workers.

Value can be added in these places through different perspectives including, quality of spaces in respect to environmental effects such as noise, light, temperature, and aesthetics. Second, by careful study of the layout pattern of physical elements in which the relationships between each other and to other components of the manufacturing workplace is carefully determined in order to serve overall objectives, Finally, by the integration of the administrative and social setting process to the physical environment.

As in the case of this study, one dimension is the focus which deals with the role of the provision of physical design features on the level of informal communication. It has been found that in the manufacturing setting, gathering places serve a vital role in integrating workers ideas while they communicate informally.

The provision of physical elements in these spaces add value in promoting chances of communication and interaction. Specifically, the findings of this study showed that hypothesised physical design features have a significant relationship in predicting and motivating chances of informal communication. Physical design features provided here were categorised as attractants, behavioural props, holding power elements, location factors, and aesthetic features.

The attractant features included two elements, namely, vending machines and the availability of a mail box, these are part of the 29 hypothesised elements of the study. It should be noted, however, that these two were not necessarily the only attractants. Designers as well as factory workplace planners may choose from different attracting elements that may suite their employees. The issue addressed here is that attractants were proven empirically to contribute to greater use of spaces and consequently initiate the chances of informal communications.

Once people are attracted, further elements are needed that function as behavioural props in order to facilitate users activity within the space. In this study, the availability of comfortable sofas in the lounge space was found to be significant in enhancing informal communication. Moreover, as users are attracted and initiate informal communication, elements of a holding power are likewise needed. In this study, food services, hot water boiler, microwave and bulletin board were included. In addition, it was found that greater lounge use was associated with location factors including places at cross pathways, on or near major traffic ways and in a central location of the building. The distance factor is very important too since break times are limited in a manufacturing setting. Furthermore, it was found that aesthetic elements of the space, do contribute in that they were used as a visual accessibility element.

In summary, as mentioned earlier, physical elements are not the only factor that affect informal communication, but they are one of a long list of predictors. It is important to determine what is provided, how it is provided, and when it is provided. In other words, good planning of support services contributes to the way in which they are used.

The totality of successful manufacturing workplaces needs to be further investigated and studied through different perspectives including the quality of the spaces, layout, and the impact of administrative and social setting. Further empirical studies are needed in this respect, since only limited studies have been conducted so far.

This study in addition to Campbell & Campbell's (1988) study can serve as the first building block for future research investigating the role of the provision of

physical design features on informal communication process in different types of workplaces such as, office environments, manufacturing, and educational settings.

Furthermore, researchers are urged to widen their perspective in dealing with internal elements of workplaces, their study should not be limited to architectural, engineering, management or psychological perspectives. They need to conduct their studies through the facilities management discipline in which the overall process of organisations are visualised including the administrative process and the other complex processes of workplaces.

10.6 Facilities management approach to the manufacturing workplace.

The discipline of facilities management plays a vital role in the late 1990's and will do so in future organisations. As the nature of facilities management has become more recognised, and as the role of the intelligent client has developed, greater emphasis is being given to strategic issues and to organisation and management skills.³³

The Centre for facilities management in Strathclyde University, UK, defined facilities management as...

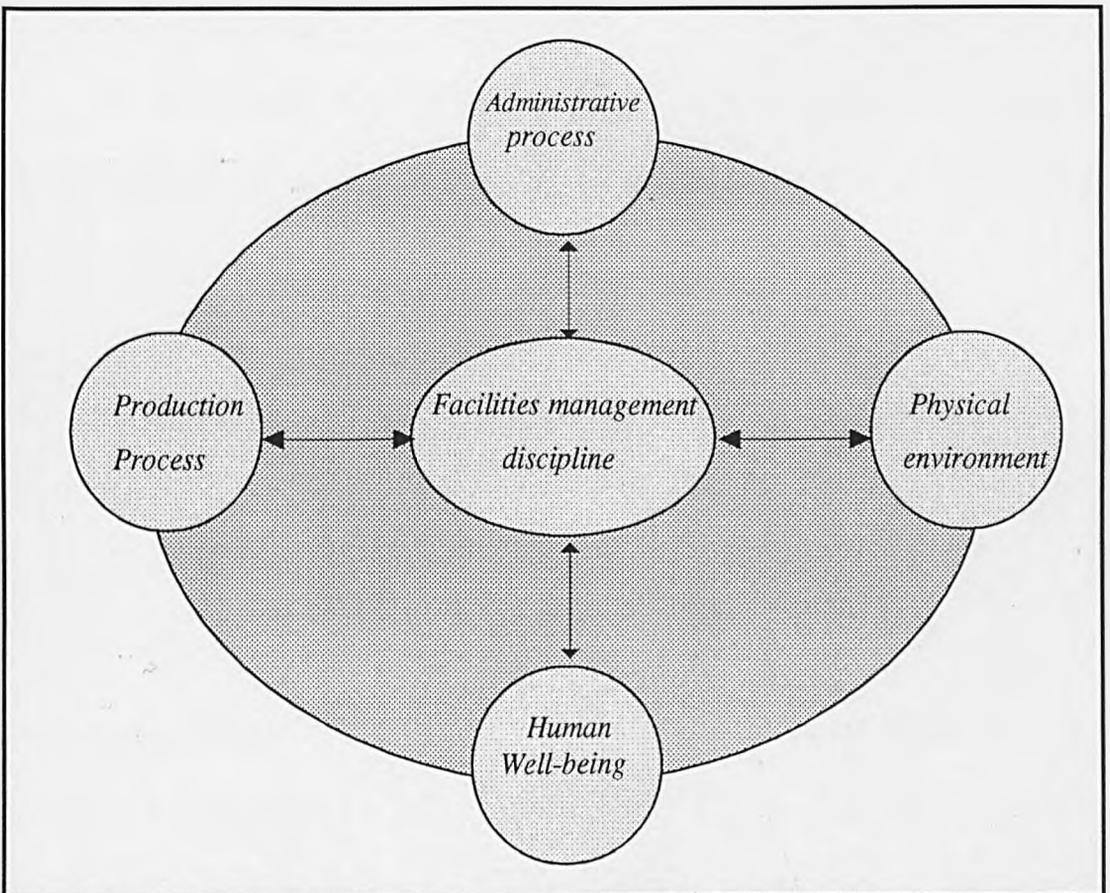
*"the process by which an organisation delivers and sustains a quality working environment and services to meet the organisation's objectives at best cost."*³⁴

The American library of Congress has proposed the following definition..

*"Facilities management is the practice of co-ordinating the physical work place with the people and work of the organisation; integrating the principles of business administration, architecture and behavioural and engineering sciences."*³⁵

In a manufacturing setting, facilities management discipline plays a central role in integrating four basic components of total outcome which include administrative process, physical building setting, production process, and human well-being of users. Figure 10.1 was developed by the researcher illustrating the role of facilities management on manufacturing setting which proposes that facilities management discipline is the process of co-ordinating administrative process, physical elements, human well-being as well as production process in a coherent way to achieve organisation's overall objectives.

Figure 10.1 Role of facilities management discipline in manufacturing setting



Source: *The Researcher* (1997).

The administrative process includes all management aspects of the organisation which concern the administrative flow to the application and understanding of core business objectives, rules and regulations and the total organisational strategic planning process.

The main driving force of the facilities management discipline is to ensure organisational effectiveness, 'facilities management' is first and foremost about organisational effectiveness.³⁶ Organisational effectiveness is defined as maintaining commitment amongst the members of the organisations, communication amongst operating units, projecting a positive and responsible image, enabling change and improving productivity.³⁷

The role of facilities management discipline is accelerating in parallel with the future organisational changes that are taking place to cope with market demands and competitiveness in a global sense.

All organisations are dynamic and undergo differing levels of change, much of it structural, to adapt to an evolving business environment.³⁸ However with the accelerating pace of such change, balancing demand and supply in managing the operational environment has become a vital element in strategic planning.³⁹

Furthermore, the role of facilities management in organisation is to support the achievement of organisational goals.⁴⁰ The understanding of administrative processes should be reflected and translated through the physical setting of buildings by application of total quality management approach (TQM), value management, risk management, building performance management, environmental management, information management, support services management, and project management processes.

As buildings become more complex and inhabit different technologies with rising user expectations and increasing attention to their welfare besides the health and safety legislation of the workplaces there is an added load on management besides the core business concerns.

Organisations of all kinds in different economies around the world recognise that the rising costs of occupying buildings, providing services to support business operations and improving work conditions are important factors in profitability.⁴¹ In the manufacturing setting, buildings must be tackled with the same attention to detail as in the production line process. One good example is found in Motorola manufacturing and distribution facility, Eastern Inch, UK, in which Motorola organisation have recognised that environment drives behaviour.

The factory building of the future will not only be a place for production and assembly line, it will be an integrated workplace that encompasses every aspect of buildings that affects the overall success of production, one of which is users well being. Consideration of workers behaviour in the manufacturing workplace is vital since they represent the living assets of the organisation. As Tornqvist, A., & Ullmark P. (1989) stated....

*.The employee has an exchange perspective in that he/she weighs the personal advantages of the working environment (e.g., social contact, variation, freedom of movement) against the disadvantages (e.g., physical wear-and tear). But, more than that, the employee also has a producer perspective in that he/she occupational skills, creative and problem solving abilities, social skills, etc.. Further-more, goods and services are not the only things produced in a plant. The layout and design of a plant also contribute to (or hinder) team work, a sense of community and the individual's ability to exert influence..*⁴²

Through the facility management discipline manufacturing buildings can be organised in a way to reflect the importance of workers through the deeper knowledge of the industrial production process, working conditions and socio-cultural background of workers. As Tornquist (1989) has argued...

*"buildings must be adaptable to changes in production, but they must also satisfy human needs for security, comfort, social contact and a congenial combination of familiarity and variety to stimulate the senses."*⁴³

Furthermore, through effective planning of facilities a value added process can be accomplished. Facilities management is not only concerned with technical issues of workplaces but it also contributes to a business strategic planning process in a holistic way rather to its specific components. Facilities management has the potential to contribute and it is important to identify and measure the extent that it does support, or can be adapted to the changing needs of organisations, and contribute to productivity, profitability, service and quality.⁴⁴

One of the best views in understanding the role of facilities management was given by Alexander, K. (1995) director of the Centre for Facilities Management, Strathclyde University, who stated that....

*"the role of facilities management is broader than the design of the product and production of the physical workspace. It entails the integration of people, technology and support services so as to achieve an organisation's mission. It is concerned primarily with the quality of service to all stakeholders in the organisation."*⁴⁵

Moreover, in changing organisations, disruption of business resources frequently occurs, therefore, the continuity of the production or service process is a vitally needed change. The consequences of interruption could be disastrous. All business resources must be effectively utilised to ensure competitiveness.⁴⁶

Facilities management discipline can play an essential role in organisational change leading to overall success of the organisational process. As Alexander, K. (1997) stated...

*facilities management is not simply the operation and maintenance of buildings, the provision of cleaning service or the recording and re-arranging of furniture in office. From the highest level in any organisation, the strategic aspect of planning for the effective provision of services offers opportunities for economy, efficiency, effectiveness and competitive advantage..*⁴⁷

The success of key business objectives is associated with different influential factors including the physical environment, cultural context and market demand factors. Facilities management role is defined by its relationship with the core business and its success is measured by the support it provides in achieving key business objectives.⁴⁸ Furthermore, people are an important part in facility management concerns, which entails the integration of people, technology and support services to achieve an organisation's mission.

The prediction of the future in today's rapid development is a challenging task, organisations should view the future in a more comprehensive way. Facilities management practice takes a positive look forward both at what the future holds and at possible steps in changing the ways in which services are delivered.⁴⁹ It is a

process by which an organisation ensures that its buildings, systems and services support core operations and processes as well as contributes to achieving its strategic objectives in changing conditions. It focuses resources on meeting users needs to support the key role of people in organisations, and strives to continuously improve quality, reduce risk, and ensure value for money.⁵⁰

This study's contribution is not limited to empirical findings of the role of physical design features provision on informal communication. Rather it provides a wider view of the manufacturing setting in reviewing organisational theories, communication theories and physical workplace approaches. It proposes that a holistic approach should be taken in managing manufacturing organisations through the facilities management discipline. This will continue to be the alternative way of managing complex aspect of organisations.

10.7 Summary

Through considering the evolution of organisation theories, this study recognises the importance of communication issues in organisations. Furthermore, the development of communication theories illustrates the increasing need for informal communication patterns in workplaces. Informal communication plays a vital role in enhancing the satisfaction of the work force which contributes to productivity and performance.

Informal communication patterns are influenced by different factors, one of which is physical design features. This study determines the role of the provision of physical design features on levels of informal communication. The study findings

show that the provision of physical design features correlates with a positive effect on the level of informal communication.

As discussed earlier, that manufacturing organisations of the future will be more complex with respect to high tech machines and the increasing needs of a knowledgeable work force, in addition to the rising competitive global market.

Therefore, managing future organisations requires a much wider view of the administrative process, workplace setting, human well-being and production process. The facilities management discipline is the right alternative approach since it views organisation as an integrated holistic process with a balance of administrative, production and building physical setting aspects.

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GLOSSARY

Activities: The things that individuals or members of a group do.

Analysis of variance (ANOVA) : a statistical method used to determine the significance of results from experimental studies.

Attitudes: Affective response, cognitive responses, and behaviours toward some objects.

Automated factories: Manufacturing plants operated mainly by machinery, including robots.

Automation: The production process that utilises control mechanisms .

Autonomous group approach: A change approach in which work groups are redesigned so that they contain virtually all of the resources and skills needed to produce a specific output.

Behaviour: Any observable and measurable response or act of an individuals.

Bureaucracy: The application of the principles of rationality and efficiency to the design of organisational structure.

Bureaucratic model: A form of organisation that places heavy emphasis upon rules, procedural specifications, impersonality, division of labour, and hierarchy.

Channels: The means by which messages travel from a sender to a receiver in interpersonal communication.

Classical organisational theory: Theories of organisation that emphasise the importance of structure in organisational functioning.

Cohesiveness: The strength of the member's desires to remain in the group and their commitment to the group.

Communication network: Overall patterning of the formal upward, downward, and horizontal communication flow in an organisation.

Communication: An exchange of information, ideas, or feelings between two or more individuals or groups.

Corporate communication: Are aspects of corporate activities which relate to the humanistically oriented facets of corporate life.

Correlates: Variables found to be associated with one another in a predictable fashion.

Correlation coefficient: An expression of the degree of relationship between two variables.

Correlation: Relationship between variables such that they change in a predictable manner with respect to one another.

Dependent variable: The variable hypothesised to respond to changes in the independent variable; the variable measured in an experiment.

Direct observation: An observational method in which the researcher records subjects overt behaviour.

Downward communication: Messages sent by superiors to subordinates.

Experiment: A research technique that allows a researcher to control the conditions to which subjects are exposed and test hypotheses about cause-effect relationships.

Facilities management: Is a process by which an organisation delivers and sustains support services in a quality environment to meet strategic needs.

Feedback: Information given about previous performance.

Formal communication: Informational exchange through the official channels of an organisation.

Gatekeeper: An individual who controls information flow.

Gathering places: Locations being habitually and frequently used to conduct informal conversation/interaction, such as lounges, corridors, mail rooms, supply room, etc..

Grapevine: Is all informal interaction and informal communication place within a group of workers.

Group cohesiveness: Summary of extent to which individual members of a group are attracted to one another and to being in the group.

Group norms: General guidelines for the behaviour of group members that express the group's values.

Hawthorne studies: the series of research studies done at the Hawthorne Electric Plant (1930), that is considered one of the cornerstones of modern industrial and organisation psychology.

Hierarchy of needs: A theory of motivation developed by Maslow (1943-1970) maintaining that humans have five levels of needs, and the highest level is a need for self-actualisation.

Human relations theory: A school of organisational theory maintaining that the quality of interpersonal relations is the most important consideration in organisational functioning.

Hygiene factors: According to the two-factor theory, hygiene factors are conditions that occur in the working environment.

Hypothesis: Statement of a predicted answer to a research question.

Independent variable: The variable that the researcher manipulates and controls in an experiment; hypothesised to have a causal effect.

Individual differences: Those aspects, such as personality, perception, and communication styles, that are uniquely identified to an individual.

Industrial setting: refers to factory building that contained an indoor industrial activity such as production area, administrative area and support facilities.

Informal communication: Unstructured information exchange that tend to occur in a face-to-face encountered interaction during OFF-TASK moments.

Information technology: Computerised equipment that makes it possible to process large amounts of information.

Integration: The process by which differentiated parts of an organisation are brought together so that the organisation can function as a whole.

Interaction: Referred to 'face-to-face' encounter between workers within workplace setting.

Interpersonal communication: The transmission and reception of ideas, feelings, and attitudes verbally and non-verbally which produce a response.

Job satisfaction: Attitude toward job based on affective (feeling) evaluative response to the job situation.

Job: A set of work activities, the completion of which serves to increase or maintain the organisation's effectiveness.

Lateral communication: Messages exchanged by peers or individuals in organisations.

Learning: A relatively permanent change in behaviour that results from reinforced practice or experience.

Linking pin: A method of improving organisational communication developed by Likert (1957-1967).

Matrix organisation: The organisation form in which dual authority, information, and reporting relationships exist.

Motivation: a predisposition to act in a specific goal-directed manner.

Need hierarchy theory: Because people are motivated by needs, when a need is present, it serves as a motivator of behaviour.

Norms: Unwritten standards for behaviour, values, and attitudes that grow out of group interaction.

Objectives: The levels of results to be attained within a specific period of time.

One-way communication: Transmission of messages in which no response is expected; usually downward communication.

Open system: System that interacts with (affects and is affected by) its external environment.

Organic systems: An organisational structure that emphasises flexibility.

Organisational bureaucracy: Is defined in terms of centralisation in decision making, formalisation and complexity of work.

Organisational climate: consensus of member perceptions about how a particular organisation and/or its subsystems deals with its members and its external environment.

Organisational culture: The patterned way of thinking, feeling, and reacting that exists in an organisation or its sub sectors.

Organisational development: Systematic effort applying behavioural science knowledge to the planned creation and reinforcement of organisational strategies, structures, and processes for improving an organisation's effectiveness.

Organisational effectiveness: Organisation's success in maintaining a) satisfaction and commitment amongst its members. b) Communication and co-ordination within and amongst its work units. c) Adequate production. d) Mutually supportive relationships with its external environment. The total workplace in offices and factories has the potential to contribute to these elements of effectiveness.

Performance appraisal: Process of evaluating the extent to which people are doing their assigned work satisfactorily.

Performance: The actual results obtained.

Predictor: A factor that is believed to be related to a criterion; analogous to an independent variable in an experiment.

Psychology: Study of human behaviour.

Quality circle: Group of employees that meets regularly to identify and solve work problems.

Regression: A statistical technique based on the correlation's of several predictors with a single criterion.

Research design: A plan, structure, and strategy of investigation developed to obtain answers to one or more research questions.

Rules: The formal written statements specifying the acceptable and unacceptable behaviours and decisions by members of organisations.

Sample: Defined portion of a specified population.

Satisfaction: An end-state that results from the attainment of some goal.

Scientific management: A system of management developed by Taylor (1911) focused on determining the most efficient method of performing specific jobs.

Social behaviour: Is a primitive characteristics often occur in face-to-face encounter which is influence by the physical setting.

Socio-technical approach: A strategy of designing work to optimise the relationship between the technical system and the social system in the organisation.

Spatial structure: Is the structure of spaces in relation to each other. The concept includes all the local and global forces that shape the overall spatial structure.

Statistic: Number that is the result of a defined set of mathematical computation procedures.

Stress: Physiological or psychological responses to demands made on the individual.

System theory: An approach to organisational theory that focuses on organisations as systems of interdependent parts.

Systems approach: An approach to the analysis of organisational behaviour which emphasises the necessity for maintaining the basic elements of input-process-output.

Task: Assigned piece of work to be finished to some standard within some time period.

Team building: Organisation development technique for finding and eliminating barriers to a work group's ability to work together effectively.

Technology: The organisation of knowledge for the achievement of practical purposes with substantial emphasis on tools, machines, and intellectual tools such as computer languages and contemporary mathematical techniques.

Theory X: The managerial assumption that employees are lazy, avoid responsibility, need direction, and must be coerced to work.

Theory Y: The managerial assumption that employees seek responsibility, like work, do not want to be controlled and threatened, and want to satisfy their needs on the job.

Theory Z: A theory developed by Ouchi (1981) maintaining that the best form of organisation is a hybrid between McGregor's (1957) theory X and Theory Y organisations.

Theory: A set of definitions and propositions that describe some aspect of reality; used to guide research.

Two-factor theory: A content theory developed by Herzberg (1959) that states that two different factors affect attitudes toward work: hygiene's and motivators.

Two-way communication: The exchange of information between two or more people.

Upward communication: Messages sent by subordinates to superiors.

Value: An enduring belief that a specific mode of conduct or end state of existence is personally or socially preferable to an opposite mode of conduct or end state of existence.

Variable: Some aspect of the world that can take on at least two different measured values.

Work groups: Two or more people who interact and influence one another with one common objectives.

APPENDIX - A

Ph.D. Research study on
“The impact of facilities on informal communication
in workplaces”

Dear

As part of a study of Ph.D. degree on the impact of lounge spaces on informal communication, I am conducting a survey concerning gathering places within your working area where informal communication can occur between labourer, forman, supervisor, manager of production line, shift manager, production manager and administrators.

Please take a few moments to fill out the attached questionnaires, and mail it back in an enclosed self-stamped address envelope.

Thank you very much for your co-operation.

Sincerely,

AMMAR S. DAHLAN
Ph.D. Candidate
University of Strathclyde
Glasgow - U.K.

APPENDIX - B

A - INTERVIEW
"ENVIRONMENTAL DESIGN CORRELATES
OF INFORMAL SOCIAL BEHAVIOUR"

FACTORY NAME :.....
FACTORY CODE :.....
PERSON INTERVIEWED :.....
AGE :.....
NATIONALITY :.....
INTERVIEWER(S) :.....

We are interested in the informal communication that occurs among production workers, and administrative staff.

First, we need to know a bit about the norms of expectations regarding informal communication among your factory workers.

1- We would like you to rate the importance of informal communication among production workers and administrative staff in your organisation.

- _____ Extremely important
- _____ Very important
- _____ Moderately important
- _____ Slightly important
- _____ Not important

2- How important is informal social interaction on a day-to-day basis within your organisation?

- _____ Extremely important
- _____ Very important
- _____ Moderately important
- _____ Slightly important
- _____ Not important

3- What provisions are there to maintain informal communication and avoid insularity among production workers and administrative staff in your factory?

- a)
- b)
- c)
- d)
- e) others

.....
.....

4- Is there a commonly known gathering place for such interaction in your factory?

- _____ YES
- _____ NO

5- Is there another such place (s)?

- _____ YES
- _____ NO

6- Is there a place that might loosely be called your factory lounge?

- _____ YES
- _____ NO

7- To what extent is an appropriately designed area needed in your factory?

- _____ Extreme need
- _____ Moderate need
- _____ Slight need
- _____ No need

8- Factory size

- _____ Approximate number of production workers?
- _____ Approximate number of administration staff?

9- Is there an area provided for individual factory workers? (e.g. office space)

- _____ YES If yes, specify _____
- _____ NO

APPENDIX - C

B - OBSERVATION 1
"GATHERING PLACE DESCRIPTION"

1- Name of place

2- Location (be specific)

3- Typical user of the lounge space:

- _____ Production worker
- _____ Administrative staff
- _____ Visitor

4- Indicate number of users of the lounge space:

- _____ Production labourers
- _____ Administrative staff
- _____ Visitors

5- If we wanted to observe the typical use of this lounge space, what time periods should we select.

- time from _____ to _____
- from _____ to _____
- from _____ to _____
- from _____ to _____

1 = Saturday 2 = Sunday 3 = Monday 4 = Tuesday 5 = Wednesday

6- Is this lounge space used as it was intended to be used?

- (1) _____ YES
- (0) _____ NO

7- How appropriate is the design of this lounge space in view of how it is being used?

- (5) _____ Very highly appropriate
- (4) _____ Highly appropriate
- (3) _____ Moderately appropriate
- (2) _____ Slightly appropriate
- (1) _____ Not at all appropriate

APPENDIX - D

C - OBSERVATION 2
"PHYSICAL FEATURES CHECKLIST"

FACTORY NAME :

FACTORY CODE :

OBSERVER :

(Check the following)

- 1- Vending machine available?
(1) _____ YES
(0) _____ NO

- 2- Seating dining chairs available?
(1) _____ YES
(0) _____ NO

- 3- Seating sofa available?
(1) _____ YES
(0) _____ NO

- 4- Dining tables available?
(1) _____ YES
(0) _____ NO

- 5- Windows to outside are present?
(1) _____ YES
(0) _____ NO

- 6- Sink present?
(1) _____ YES
(0) _____ NO

- 7- Lounge temperature
(1) _____ HOT
(2) _____ MODERATE
(3) _____ COLD

- 8- Coffee maker (as master coffee machine).
(1) _____ YES
(0) _____ NO

- 9- Hot water boiler present?
(1) _____ YES
(0) _____ NO
- 10- Is food catering service available?
(1) _____ YES
(2) _____ NO
- 11- Is mail box available?
(1) _____ YES
(0) _____ NO
- 12- Is flip chart present with a chalk?
(1) _____ YES
(0) _____ NO
- 13- Microwave or oven present?
(1) _____ YES
(0) _____ NO
- 14- Reading materials present (e.g. periodicals, textbooks, newspapers) ?
(1) _____ YES
(0) _____ NO
- 15- Lighting amount?
(3) _____ quite bright
(2) _____ intermediate/comfortable brightness
(1) _____ dim/dark
- 16- On or near major traffic way?
(1) _____ YES
(0) _____ NO
- 17- Flow through traffic (vs. single entrance)
(1) _____ YES
(0) _____ NO
- 18- At a cross pathway?
(1) _____ YES
(0) _____ NO
- 19- Central location within the factory?
(1) _____ YES
(0) _____ NO

- 20- Attached to production area?
(1) _____ YES
(0) _____ NO
- 21- Attached to administrative office?
(1) _____ YES
(0) _____ NO
- 22- Visual contact between passers-by and occupants?
(1) _____ absolutely invisible
(2) _____ slightly invisible
(3) _____ visible
(4) _____ slightly visible
(5) _____ absolutely visible
- 23- Aural (hearing) contact between passers-by and occupants?
(1) _____ noisy
(2) _____ moderate
(3) _____ quiet
- 24- Is public telephone available?
(1) _____ YES
(0) _____ NO
- 25- Is working television available?
(1) _____ YES
(0) _____ NO
- 26- Video tape showing educational or recreational films available?
(1) _____ YES
(0) _____ NO
- 27- Are video games available?
(1) _____ YES
(0) _____ NO
- 28- Is bulletin board available?
(1) _____ YES
(0) _____ NO
- 29- Decoration?
(1) _____ highly pleasing
(2) _____ moderately pleasing
(3) _____ low in pleasing qualities

APPENDIX - E

C - OBSERVATION 3
 "BEHAVIOUR CHECKLIST"

FACTORY NAME :

FACTORY CODE :

OBSERVER :

DATE :

WEEK DAY :

TIME : From To

1- Indicate number of people with numerical tally numbers.

Type of Users	Type of Behaviour	
	isolated	social
Production workers		
Administrative staff		

2- Indicate the type of activity of lounge users, (average per each category)

- _____ Eating
- _____ Drinking
- _____ Playing games
- _____ Watching television
- _____ Reading
- _____ Smoking
- _____ Relaxing
- _____ Gossiping
- _____ Discuss work duties
- _____ Discuss social matters
- _____ Others: _____
- _____ Others: _____
- _____ Others: _____

TABLES

TABLE 6.1
SAUDI INDUSTRIAL CITIES SUPERVISED BY MINISTRY OF INDUSTRY & ELECTRICITY

	INDUSTRIAL CITY LOCATION	NUMBER OF STAGES	AREA by (1000m2)	TOTAL INVESTED CAPITAL (SR)	NUMBER OF PRODUCING FACTORIES	STATUS OF STAGE
1	RIYADH 1st	first	451	35,000,000	59	developed
2	RIYADH 2nd	first	5600	196,130,000	319	developed
		second	6400	396,054,674		developed
		third	3786	----		under develop
		housing	3000	----		under develop
3	JEDDAH	first	498	35,000,000	317	developed
		second	1044	30,657,900		developed
		third	3212	138,970,000		developed
		fourth	4004	206,093,902		developed
		fifth	3335	----		under develop
		housing	925	----		under develop
4	DAMMAM 1st	----	2704	115,000,000	103	developed
5	DAMMAM 2nd	first	3100	174,927,782	67	developed
		second	3600	270,425,252		developed
		third	6186	----		under develop
		housing	2676	----		under develop
6	AL AHSAA	first	538	68,909,146	14	developed
		second	515	63,604,739		developed
		third	447	----		under develop
7	AL QASSEM	first	675	69,006,423	23	developed
		second	478	58,287,940		developed
		third	347	----		under develop
8	MAKKAH AL MUKARAMAH	first	758	45,000,000	16	developed

Ref.: The Directory of Saudi Industries (1994)

TABLE 6.2 FACTORIES IN JEDDAH CITY / Sectors / 1992

SL No.	SECTOR NAME	No. of Factories	% ratio Total No. of Fact.
1	FOOD PRODUCTS INDUSTRY	61	19.24%
2	PAPER PRODUCT INDUSTRY	28	8.83%
3	FURNITURE INDUSTRY	7	2.21%
4	CHEMICAL INDUSTRY	73	23.04%
5	BUILDING & DECORATION INDUSTRY	38	11.99%
6	METAL INDUSTRY	49	15.45%
7	JEWELRY & GOLD	8	2.53%
8	WOODEN INDUSTRY	6	1.89%
9	ELECTRICAL INDUSTRY	17	5.36%
10	TEXTILE INDUSTRY	6	1.89%
11	OTHER INDUSTRY	24	7.57%
Total / Average		317	100.00%

Ref. The Directory of Saudi Industries (1994)

TABLE 6.3**Category of Factories VS. No. of Employees in Jeddah Industries**

Category	No. of Employees	No. of Factories
A	100 to 200	56
B	201 to 400	40
C	401 to 600	11
D	601 plus	5
	T O T A L	112

Reference: Jeddah National Industrial Directory, Year 1993-1994

Table 6.4

STUDY OF JEDDAH SELECTED INDUSTRIES

SL No.	FACTORY NAME	C AT.	No. EMPL.	LOUNGE SPACES			VEND. MACH.		WORKING TIME				
				YES	SQ.M.	NO	YES	NO	From	To	From	To	Break Time
1 - FOOD PRODUCTS INDUSTRY													
1-1	National Biscuits & Confectionery Co.	C	268	x					08:30	05:30			1:00 - 2:00 pm
1-2	Fakieh Feed Factory	A	183	x					08:00	04:00			12:30 - 1:15 pm
1-3	Saudi Food Industry Co. Ltd.	A	150	x					08:00	04:00			1:00 - 2:30 pm
1-4	BINZAGR Company Ltd.	A	140	x					08:00	05:00			no break
1-5	Saudi Badrah Factory	C	448	x	25 sqm.				10:30	03:00	06:00	09:00	12:30 - 1:15 pm
1-6	Al Amoudi Beverage Industries	B	320	x					08:00	02:00	05:00	08:00	no break
1-7	Makkah Water Co. (SAFA)	B	235			x			08:00	01:00	05:00	09:00	no break
1-8	Saudi Bakeries Company	B	259			x			08:00	05:00			1:15 - 2:15 pm
1-9	Al-Esay Beverage Corp.	B	278			x			08:00	12:00	04:30	08:00	no break
1-10	Saudi Industrial Projects Co.	A	150	x					08:00	03:00	06:00	08:00	12:30 - 1:00 pm
1-11	Saudi Ice Cream Factory	B	300	x					08:00	05:00			12:30 - 1:00 pm
1-12	National Confectionary & Tahina Fact.	A	140	x					08:00	04:30			12:00 - 1:00 pm
1-13	Saudi Fruit Juice & Beverage Ind.	A	130	x					08:00	05:00			12:15 - 1:00 pm
1-14	Saudi Danish Dairy Co. Ltd.	D	959	x					08:00	04:30			12:45 - 1:30 pm
1-15	The Savola Company	D	870	x					08:00	04:30			12:15 - 1:00 pm
1-16	Savola Snack Foods Company	C	444	x	120 sqm.				08:00	04:30			12:00 - 1:30 pm
1-17	Saudi Modern Foods Factory	A	150			x			08:00	05:30			12:40 - 1:40 pm
1-18	National Food Industries Company	A	171	x					06:00	06:00			12:00 - 1:30 pm
1-19	Halwani Brothers	A	100	x					08:00	04:30			12:00 - 1:00 pm
1-20	National Food Company (meat division)	A	170			x			08:00	05:30			12:00 - 1:15 pm
1-21	Al Sunbolah	B	310	x					07:00	07:00			12:00 - 1:30 pm
1-22	Jamjoom Foremost Limited	B	221	x					08:00	12:15			no break
1-23	Modern Dairies Company Ltd.	A	134	x					09:00	05:00	05:30	08:00	12:15 - 1:30 pm
1-24	Saudi Modern Foods Factory	A	124	x					08:00	05:30			12:40 - 1:15 pm
1-25	Al Kawther Industries Company Ltd.	B	212	x					08:00	05:00			no break

2 - PAPER PRODUCTS INDUSTRY												
2-1	Sahar Printing Press	A	107	x				08:00	04:30		no break	
2-2	Hygienic Paper Co. Ltd.	B	275	x				08:00	04:30		12:00 - 2:00 pm	
2-3	National Paper Co. Ltd.	A	193	x				08:00	04:30		12:15 - 1:15 pm	
2-4	Jeddah Graphic Center	A	172			x		08:30	01:30	04:30	8:00	no break
2-5	Modern Products Company	B	385	x				08:00	12:00			no break
2-6	Al-Madina Printing & Publication	A	184			x		08:00	04:00			12:30 - 1:30 pm
2-7	DAR OKAZ Printing & Publishing	B	400			x		08:00	04:00			12:15 - 1:15 pm
2-8	Safaripak Limited	A	135	x				08:00	05:00			12:00 - 1:00 pm
2-9	Dar Alasfahani Printing & Press	B	211			x		08:00	04:00			1:00 - 2:00 pm
2-10	Nasr Packaging & Printing Co.	A	161			x		08:00	08:00			1:30 - 2:30 pm
2-11	United Carton Industries Company	B	218	x				06:00	06:00			1:30 - 2:30 pm
2-12	Saudi Carton Factory	A	120	x				08:30	04:30			12:00 - 1:30 pm
				x								
3 - FURNITURE INDUSTRY												
3-1	Arabian Spring & Foam Mattress	C	469	x				07:30	01:00	02:00	04:00	1:00 - 2:00 pm
3-2	Saudi Company for Light Industries	A	127			x		08:00	12:00	01:30	05:30	12:00 - 1:30 pm
3-3	Jeddah Foam Laminates Factory	B	360	x	20 sqm.			08:00	05:00			12:00 - 2:00 pm
4 - CHEMICAL INDUSTRY												
4-1	Altayar Plastic & Rubber Mfg. Co.	C	500	x				08:30	01:30	04:30	07:30	1:30 - 4:30 pm
4-2	ARIFCO Plastic Factory	B	217	x				08:00	04:00			12:00 - 1:00 pm
4-3	Saudi Arabian Glass Co. Ltd.	B	355	x				08:00	04:00			12:00 - 1:00 pm
4-4	Abudawood for Trade & Industry	A	120	x				07:00	04:00			12:00 - 1:15 pm
4-5	Modern Industries Company	B	262	x				07:30	04:00			12:00 - 1:30 pm
4-6	Jeddah Oil Refinery Co.	D	1929	x				07:00	04:00			12:00 - 1:15 pm
4-7	Petromin Factory for Mixing Oil	B	343	x				08:00	04:30			1:00 - 2:00 pm
4-8	Petromin Lubricating Oil Co.	B	335	x				08:00	04:30			1:00 - 2:00 pm
4-9	Pharmaceutical Solution Industries	B	253	x				08:00	05:00			1:00 - 2:00 pm

4-10	Saudi Perfume & Cosmetics Indus.	A	154	x				08:00	05:00			1:00 - 2:00 pm
4-11	Arabian Gulf Manufactures Ltd.	D	788	x				08:30	01:30	04:30	07:30	1:30 - 4:30 pm
4-12	National Factory for Plastic Ind. Ltd.	A	170	x				08:00	01:30	04:30	07:30	1:30 - 4:30 pm
4-13	Abdullah Hashim Indust. Gases & Eqpt.	A	110			x		07:30	12:30	02:00	05:00	12:30 - 2:00 pm
4-14	Binzagr Lever Limited	B	220	x				08:00	05:00			12:15 - 1:15 pm
4-15	Saudi Arabian Market & Shail Lubricants	A	104	x				08:00	04:00			12:00 - 1:00 pm
4-16	Al Tawfiq Co. for Plastic & Chem. Ind.	A	134	x				07:30	04:30			12:00 - 1:00 pm
4-17	Saudi Industries for PVC Windows Co.	A	136	x				07:00	03:00	03:00	11:00	12:30 - 1:00 pm
4-18	Jeddah Plastic Factory	A	128	x				06:30	06:30			12:30 - 1:00 pm
4-19	Al Jilani Radwan Plastic Factory	A	102			x		07:00	03:00			12:00 - 1:00 pm
4-20	Saudi Industries for Pipes and Co. Ltd.	A	139			x		08:30	05:30			12:30 - 1:00 pm
4-21	Saudi Chemical Industries Co. Ltd.	A	119	x				07:00	04:00			12:00 - 1:00 pm
4-22	Fosam Company Limited	A	127			x		09:00	05:30			12:00 - 1:00 pm
4-23	National Glass & Mirrors Co. Ltd.	A	137	x				08:00	05:00			12:00 - 1:30 pm
4-24	Advertising Publicity & Decor Product	C	550	x				08:00	12:00	01:00	06:00	12:00 - 1:00 pm
5 - BUILDING & DECORATION INDUSTRY												
5-1	The Arabian Marble & Alum. Factory	A	102			x		08:00	08:00			12:00 - 2:00 pm
5-2	IBSF - Industrialized building Saudi	A	136			x		09:00	02:00	05:00	09:00	2:00 - 5:00 pm
5-3	Industrial & Commercial relations Co.	B	207			x		06:00	02:00			no break
5-4	Arabian Co. for building Manufdeveloping	B	213	x	50 sqm.			08:00	12:00	02:00	06:00	12:00 - 2:00 pm
5-5	Saudi Marble Company	B	203	x	24 sqm.			08:00	01:00	04:30	08:30	1:00 - 4:30 pm
5-6	Binladen Factory for marble & granite	A	119			x		07:30	03:30			12:30 - 1:15 pm
5-7	Red bricks Saudi Company	B	312	x				10:00	02:00	05:00	09:00	2:00 - 5:00 pm
5-8	Alkhayat Factory for Red bricks	B	317			x		07:30	03:30			12:00 - 1:00 pm
5-9	AlHamrani Co. for Industries	B	280			x		07:30	03:30			12:00 - 1:15 pm
5-10	Red Sea Mining Co. Ltd.	A	123	x				08:30	05:00			12:30 - 1:30 pm
5-11	National Granites Company	A	194			x						
5-12	Advertising Publicity & Decor. Prod.	A	175	x	50 sqm.			08:30	01:30	04:30	08:00	1:30 - 4:30 pm
5-13	Saudi Red Bricks Company	B	252			x		08:30	01:30	04:30	08:00	1:30 - 4:30 pm

5-14	General Agencies	C	500	x				07:30	05:00				12:15 - 1:15 pm
5-15	Al Ghamdi Marble Ltd.	A	136				x	08:00	12:00	01:00	05:00		12:00 - 1:00 pm
5-16	Saudi Building Systems Manuf. Co.	B	257				x	08:00	04:00				12:00 - 1:15 pm
6 - METAL INDUSTRY													
6-1	Hidada Company	C	528	x				08:00	05:00				12:00 - 1:00 pm
6-2	Saudi Can Co. Limited	A	145	x				08:30	05:00				12:00 - 1:00 pm
6-3	Jeddah Beverage can making	A	179	x				08:00	04:00				12:00 - 1:00 pm
6-4	Saudi Building Systems Mfg.	B	205	x				08:00	04:30				12:15 - 1:15 pm
6-5	Saudi German Alum. Products Co.	A	146	x				08:00	05:30				12:00 - 1:00 pm
6-6	Arabian Co. for Metal Industries	A	204				x	08:00	05:30				12:00 - 1:00 pm
6-7	Aluminium Manufacturing Co. Ltd.	A	150	x				08:00	05:00				12:00 - 1:15 pm
6-8	Metal Work Company	B	220	x				08:00	12:30	02:30	06:30		12:30 - 2:30 pm
6-9	Aluminium Products Co. Ltd.	B	282	x				07:30	04:30				12:15 - 1:15 pm
6-10	National Automobile Industry Co.	B	233	x	225+225 sqm.			07:00	04:00				12:00 - 1:30 pm
6-11	Binladin Factory for Metal Works	C	567				x						12:00 - 1:00 pm
6-12	National Factory for Can Indus. Ltd.	B	205	x									12:00 - 1:00 pm
6-13	Al Mutlak Metal Industries	B	240	x									12:00 - 1:00 pm
6-14	Al Zamil Heavy Industries Co.	B	350	x									12:00 - 1:00 pm
6-15	Saudi B.R.C. Al Foda Co. Ltd.	A	132				x						12:15 - 1:00 pm
6-16	Jamjoom Metal Industries Co. Ltd.	A	170	x									12:30 - 1:00 pm
6-17	Al Haramain Industrial Group Co.	A	140				x						12:15 - 1:15 pm
6-18	Assima Aluminium Factory	A	138				x						12:30 - 1:00 pm
6-19	Saudi Exhaust System Co.	A	106	x									12:00 - 1:00 pm
7 - JEWELRY & GOLD													
7-1	Mouawad Nat'l. Co. for Jewelries & Watc	A	147	x				08:00	01:00	03:30	07:30		1:00 - 3:30 pm
7-2	Almusali Factory for Jewelry	C	520				x	08:00	01:30	05:00	08:00		1:30 - 5:00 pm
7-3	Hussain A. Saklou & Sons Indus. Co.	A	130				x						12:30 - 1:30 pm

8 - WOODEN INDUSTRY													
8-1	Binladen Wood Work Factory	A	197			x			07:00	12:30	01:30	04:30	12:30 - 1:30 pm
9 - ELECTRICAL INDUSTRY													
9-1	Saudi Cable Company	D	1002	x	400 sqm.				08:00	04:30			12:00 - 1:30 pm
9-2	Jeddah Cable Factory	B	230	x					08:00	05:00			12:00 - 1:00 pm
9-3	Saudi Fac. for Electric Machinery Co.	A	147	x					08:00	04:30			12:00 - 1:15 pm
9-4	Nasr Industrial Corp. for Household Appl.	A	125	x					08:00	05:00			12:00 - 1:15 pm
9-5	Saudi AirCondition Ltd. Co.	B	290	x					08:00	04:30			12:15 - 1:15 pm
10 - TEXTILES INDUSTRY													
10-1	Alsraia Factory for Carpet	A	106	x					08:30	05:00			12:00 - 1:00 pm
10-2	Saudi Spinning & Weaving Industries	B	280	x					08:00	05:00			12:00 - 1:00 pm
10-3	Bahlas National Carpets Factory	C	600			x			08:00	12:00	02:00	06:00	12:00 - 1:00 pm
10-4	Shuwaa Factory for travel casbs	A	150			x			08:00	05:00			12:00 - 1:00 pm

Ref. The Researcher (1997)

TABLE 6.5

Jeddah selected Industries - Availability of lounge space - Categories - Sectors
 Number of Factories/sector, Study, Test, Sample, relationship

Sector No.	SECTORS	Number of factories per sector	Refreshment Facilities								Study sample			
			YES				NO				YES			
			A	B	C	D	A	B	C	D	A	B	C	D
1	FOOD PRODUCTS INDUSTRY	25	9	5	3	2	3	3	0	0	1	1	1	
2	PAPER PRODUCTS INDUSTRY	12	4	3	0	0	3	2	0	0	1			
3	FURNITURE INDUSTRY	3	0	1	1	0	1	0	0	0				
4	CHEMICAL INDUSTRY	24	9	7	2	2	4	0	0	0	1			
5	BLDG. & DECORATION INDUSTRY	16	2	4	1	0	5	4	0	0				
6	METAL INDUSTRY	19	6	7	1	0	3	1	1	0		1		
7	OTHER MANUFACTURING INDUS.	3	1	0	0	0	1	0	1	0				1
8	WOODEN INDUSTRY	1	0	0	0	0	1	0	0	0				
9	FABRICATED METAL PRODUCTS	5	2	2	0	1	0	0	0	0				
10	TEXTILES INDUSTRY	4	1	0	0	0	1	1	1	0				
TOTAL			34	29	8	5	22	11	3	0	3	2	1	1
SUB-TOTAL			76				36				7			
GRAND TOTAL		112	112								7			

Ref. The Researcher (1997)

TABLE 6.6

SAMPLE STUDY TEST SETTINGS

Item No.	SL.No.	Factory Names	Sector	Category	No. of Employees	Lounge approx. area/sqm.	Working Time				Break Time
							From	To	From	To	
1	1-18	National Food Indus. Co.	Food Product Industry	A	171	30 sqm.	24 hours/ 3 shift / 3 hr.perday				12:00-1:30
2	1-21	Al Sunbolah	Food Product Industry	B	310	60 sqm.	24 hours / 3 shift / 3 hr.perday				12:00-1:30
3	2-12	Saudi Carton Factory	Paper Products Indus.	A	120	30 sqm.	08:30	04:30	05:30	01:30	12:00-1:30
4	4-23	National Glass Factory	Chemical Industry	A	137	30 sqm.	08:00	05:00			12:00-1:30
5	6-10	Natl. Automobile Indus.Co.	Metal Industry	B	233	200 sqm.	07:00	04:00			12:00-1:30
6	1-16	Savola Snack Foods Co.	Food Products Industry	C	444	120 sqm.	08:00	04:30			12:00-1:30
7	9-1	Saudi Cable Company	Electrical Industry	D	1002	400 sqm.	08:00	04:30			12:00-1:30

Ref. The Researcher (1997)

TABLE 6.7

DATA COLLECTION SCHEDULE

Observer Name	Factory SL.No.	Factory Name	OBSERVATION ON SITE				w/o V.M.	with V.M.
					TIME			
			Day	Week	From	To		
1	1-18	National Food Indus.Co.	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
2	1-21	Al Sunbolah	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
3	2-12	Saudi Carton Factory	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
4	4-23	National Glass Factory	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
5	6-11	Natl. Automobile Indus. Company	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
6	1-16	Savola Snack Foods Company	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.
7	9-1	Saudi Cable Company	Sat.	1	12:00	01:30	4 Mar.	1 Apr.
			Sun.	2	12:00	01:30	12 Mar.	9 Apr.
			Mon.	3	12:00	01:30	20 Mar.	17 Apr.
			Tues.	4	12:00	01:30	28 Mar.	25 Apr.

Total observations on site will be:

$$7 \text{ factories} \times 4 \text{ weeks} \times 2 \text{ day/wk.} \times 1 \text{ observations/day} \\ = 56 \text{ observations (during March 1995)}$$

Another 56 observations will be conducted during (Apr. 1995) to test same study setting (7 factories x 4 weeks x 2 day/wk. x 1 obser./day). But with the introduction of Vending Machine element to each lounge as additional features in order to examine the effect of social interaction compared to first study.

Since Vending Machine is consider an element of behavioral props to attract and hold people in the space which result in assumed positive social interaction. Therefore, the proposed observation will precisely grand totalling to 112 observations.

Level 1 - Users density with physical design features

- Table 7.1 Correlation of total number of lounge users with total number of physical design features. (Test 1.1.1)
- Table 7.2 Correlation of total number of lounge users with each of the physical design features. (Test 1.2.1)
- Table 7.3 Correlation of total number of lounge users informally communicating with total number of physical design features. (Test 1.3.1)
- Table 7.4 Correlation of total number of lounge users informally communicating with each of the physical design features. (Test 1.4.1)

Table 7.1 Correlation of total number of lounge users with total number physical design features. (Test 1.1.1)

PREDICTOR	Total Number of Lounge users $r =$
Total number of physical design features	0.798

- Significant level $r > 0.31$

Table 7.2 Correlation of total number of lounge users with each of the physical design features. (Test 1.2.1)

SL No.	Prediction	Total No. of Lounge users r =
1	Vending machine	0.231
2	Seats	0.100
3	Sofa	0.574
4	Dining table	0.107
5	Window	0.354
6	Sink	0.348
7	Temperature	-0.013
8	Coffee maker	0.348
9	Hot water boiler	0.257
10	Food	0.348
11	Mail box	0.761
12	Microwave	0.209
13	Reading materials	0.761
14	Light	0.121
15	Noise	-0.084
16	Near major traffic way	0.350
17	Flow through traffic	-0.089
18	Cross pathway	-0.033
19	Central location	0.274
20	Near prod-a	0.159
21	Near admi-a	0.278
22	Visual	-0.375
23	Aural	-0.068
24	Public phone	0.720
25	Television	0.761
26	Video film	0.761
27	Video game	0.761
28	Bul-board	0.761
29	Decor	0.119

Table 7.3 Correlation of total number of lounge users informally communicating with total number of physical design features. (Test 1.3.1)

PREDICTOR	Total Number of Lounge users informally communicating r =
Total number of physical design features	0.790

- Significant level $r > 0.31$

Table 7.4 Correlation of total number of lounge users informally communicating with each of the physical design features. (Test 1.4.1)

SL No.	Prediction	Total No. of Lounge users informally communicating r =
1	Vending machine	0.222
2	Seats	0.102
3	Sofa	0.580
4	Dining table	0.110
5	Window	0.355
6	Sink	0.354
7	Temperature	-0.011
8	Coffee maker	0.354
9	Hot water boiler	0.241
10	Food	0.354
11	Mail box	0.739
12	Microwave	0.199
13	Reading materials	0.739
14	Light	0.131
15	Noise	-0.084
16	Near maj. traffic way	0.334
17	Flow through traffic	-0.091
18	Cross pathway	-0.016
19	Central location	0.263
20	Near prod-a	0.162
21	Near admi-a	0.268
22	Visual	-0.362
23	Aural	-0.067
24	Public phone	0.698
25	Television	0.739
26	Video film	0.739
27	Video game	0.739
28	Bul-board	0.739
29	Decor	0.123

Level 1 - Users density (dependent) with physical design features

- | | |
|-----------|---|
| Table 7.5 | Regression of total number of lounge users with total number of physical design features. (Test 1.1.2) |
| Table 7.6 | Regression of total number of lounge users with each of the physical design features. (Test 1.2.2) |
| Table 7.7 | Regression of total number of lounge users informally communicating with total number of physical design features. (Test 1.3.2) |
| Table 7.8 | Regression of total number of lounge users informally communicating with each of the physical design features. (Test 1.4.2) |

Table 7.5 Regression of total number of lounge users on total number of physical design features. (Test 1.1.2)

PREDICTOR	Total Number of Lounge users (P value)
Total number of physical design features	0.000
R-sq = 63.7 %	
ANOVA P = 0.000	

Significant level where $P < 0.10$

Table 7.6 Regression of total number of lounge users with each of the physical design features. (Test 1.2.2)

SL No.	Prediction	Total No. of Lounge users (P value)
1	Vending machine	0.000
2	Seats	0.494
3	Sofa	0.000
4	Dining table	0.263
5	Window	0.313
6	Sink	0.422
7	Temperature	0.233
8	Coffee maker	H.C.W.O. *
9	Hot water boiler	0.371
10	Food	H.C.W.O. *
11	Mail box	0.001
12	Microwave	0.046
13	Reading materials	H.C.W.O. *
14	Light	0.436
15	Noise	0.657
16	Near maj. traffic way	0.001
17	Flow through traffic	0.126
18	Cross pathway	0.216
19	Central location	0.472
20	Near prod-a	0.014
21	Near admi-a	0.939
22	Visual	0.013
23	Aural	0.338
24	Public phone	0.306
25	Television	H.C.W.O. *
26	Video film	H.C.W.O. *
27	Video game	H.C.W.O. *
28	Bul-board	H.C.W.O. *
29	Decor	0.743
R-sq = 95.2 %		
ANOVA P = 0.000		

- * - High correlation with other variables
- Significant level where $P < 0.1$

Table 7.7 Regression of total number of lounge users informally communicating with total number of physical design features. (Test 1.3.2)

PREDICTOR	Total Number of Lounge users informally communicating (P value)
Total number of physical design features	0.000
R-sq = 99.3 %	
ANOVA P = 0.000	

Table 7.8 Regression of total number of lounge users informally communicating with each of the physical design features. (Test 1.4.2)

SL No.	Prediction	Total No. of Lounge users informally communicating (P value)
1	Vending machine	0.000
2	Seats	0.561
3	Sofa	0.000
4	Dining table	0.257
5	Window	0.336
6	Sink	0.422
7	Temperature	0.361
8	Coffee maker	H.C.W.O. *
9	Hot water boiler	0.321
10	Food	H.C.W.O. *
11	Mail box	0.002
12	Microwave	0.039
13	Reading materials	H.C.W.O. *
14	Light	0.327
15	Noise	0.749
16	Near maj. traffic way	0.001
17	Flow through traffic	0.147
18	Cross pathway	0.199
19	Central location	0.479
20	Near prod-a	0.172
21	Near admi-a	0.978
22	Visual	0.259
23	Aural	0.344
24	Public phone	0.399
25	Television	H.C.W.O. *
26	Video film	H.C.W.O. *
27	Video game	H.C.W.O. *
28	Bul-board	H.C.W.O. *
29	Decor	0.791
R-sq = 94.6 %		
ANOVA P = 0.000		

* - High correlation with other variables
 - Significant level, where $P < 0.1$

Level 1 - Users density with physical design features

Table 7.9 Step-regression of total number of lounge users with each physical design features. (Test 1.2.3)

Table 7.10 Step-regression of total number of lounge users informally communicating with each of physical design features. (Test 1.4.3)

Table 7.9 Step-regression of total number of lounge users with each physical design features. n=112 (Test 1.2.3)

STEP	1	2	3	4	5	6	7
constant	80.67	51.00	-54.09	-72.62	-156.79	-186.52	-206.89
bull-board T-RATIO	236 12.29	266 13.98	262 16.34	260 17.67	216 13.1	216 15.26	164 10.89
cross-pw T-RATIO		59.3 4.41	86.7 7.23	82.6 7.47	103.9 9.34	103.4 10.83	100.5 12.11
food T-RATIO			110 6.81	108 7.29	170 8.91	232 12.09	227 13.57
vend T-RATIO				44.44 4.60	42.8 4.84	45.1 5.93	45.2 6.85
boiler T-RATIO					66 4.64	95 7.25	118 9.83
micro T-RATIO						-62.4 -6.22	-59.2 -6.79
sofa T-RATIO							52.00 5.97
S	71.2	65.9	55.4	50.9	46.6	40.00	34.70
R-SQ	57.87	64.25	74.99	79.12	82.64	87.31	90.55

Table 7.10 Step-regression of total number of lounge users informally communicating with each physical design features. n=112 (Test 1.4.3)

STEP	1	2	3	4	5
constant	72.4375	53.375	53.375	18.0667	-0.5340
mail-b T-RATIO	200.8 11.5	162.7 8.88	243.8 16.92	243.8 21.61	243.8 27.94
sofa T-RATIO		57.2 4.42	138.3 12.14	173.6 17.58	172.3 22.54
near major traffic way T-RATIO			-16 -11.26	-229 -16.54	-226 -21.14
micro T-RATIO				66.5 8.31	64.00 10.33
vend T-RATIO					39.9 8.54
S R-SQ	64.6 54.61	59.8 61.50	40.8 82.29	31.9 89.24	24.7 93.62

Level 2 - Variety of activity with physical design features

Table 7.11 Correlation of variety of lounge users activity with total number of physical design features. (Test 2.1.1)

Table 7.12 Correlation of variety of lounge users activity with each of physical design features. (Test 2.2.1)

Table 7.11 Correlation of variety of lounge users activity with total number of physical design features. (Test 2.1.1)

PREDICTOR	Total Number of Lounge users $r =$
Total number of physical design features	0.141

- Significant level $r > 0.31$

Table 7.12 Correlation of variety of lounge users activity with each of physical design features. (Test 2.2.1)

SL No.	Prediction	Variety of activity users $r =$
1	Vending machine	0.741
2	Seats	-0.124
3	Sofa	-0.094
4	Dining table	-0.124
5	Window	0.139
6	Sink	0.044
7	Temperature	0.325
8	Coffee maker	0.044
9	Hot water boiler	-0.069
10	Food	0.044
11	Mail box	-0.056
12	Microwave	0.162
13	Reading materials	-0.056
14	Light	0.108
15	Noise	0.043
16	Near major traffic way	-0.669
17	Flow through traffic	-0.158
18	Cross pathway	0.202
19	Central location	-0.077
20	Near prod-a	-0.041
21	Near admi-a	-0.048
22	Visual	-0.209
23	Aural	-0.034
24	Public phone	-0.061
25	Television	-0.056
26	Video film	-0.056
27	Video game	-0.056
28	Bul-board	-0.056
29	Decor	-0.026

- Significant level where $r > 0.31$

Level 2 - Variety of lounge users activity with physical design features

Table 7.13 Regression of variety of lounge users activity on total number of physical design features. (Test 2.1.2)

Table 7.14 Regression of variety of lounge users activity with each of the physical design features. (Test 2.2.2)

Table 7.13 Regression of variety of lounge users activity on total number of physical design features. (Test 2.1.2)

PREDICTOR	Total Number of Lounge users (P value)
Total number of physical design features	0.139
R-sq = 2.0 %	
ANOVA P = 0.139	

- Significant level where $P < 0.10$

Table 7.14 Regression of variety of lounge users activity with each of the physical design features. (Test 2.2.2)

SL No.	Prediction	Variety of activity (P value)
1	Vending machine	0.000
2	Seats	0.603
3	Sofa	0.604
4	Dining table	0.336
5	Window	0.019
6	Sink	0.782
7	Temperature	0.045
8	Coffee maker	H.C.W.O. *
9	Hot water boiler	0.527
10	Food	H.C.W.O. *
11	Mail box	0.832
12	Microwave	0.689
13	Reading materials	H.C.W.O. *
14	Light	0.829
15	Noise	0.859
16	Near maj. traffic way	0.476
17	Flow through traffic	0.384
18	Cross pathway	0.708
19	Central location	0.413
20	Near prod-a	0.153
21	Near admi-a	0.126
22	Visual	0.419
23	Aural	0.138
24	Public phone	0.888
25	Television	H.C.W.O. *
26	Video film	H.C.W.O. *
27	Video game	H.C.W.O. *
28	Bul-board	H.C.W.O. *
29	Decor	0.498
R-sq = 69.7 %		
ANOVA P = 0.000		

* - High correlation with other variables
 - Significant level is P < 0.10

Level 2 - Variety of lounge users activities with physical design features

Table 7.15 Step-regression of variety of lounge users activity with each of the physical design features. (Test 2.2.3)

Table 7.15 Step-regression of variety of lounge users activity with each of the physical design features. n=112 (Test 2.2.3)

STEP	1	2	3	4	5	6
constant	4.964	3.406	5.469	7.557	4.609	3.336
vend T-RATIO	3.16 11.57	3.00 11.16	2.96 11.16	2.92 11.4	2.95 11.74	2.97 11.9
temp T-RATIO		0.79 2.98	0.75 2.87	0.75 2.97	0.7 2.83	0.7 2.82
visual T-RATIO			-0.56 -2.15	-1.04 -3.51	-0.32 -0.75	
cent-loc T-RATIO				-0.91 -3.07	-1.33 -3.88	-1.35 -3.96
micro T-RATIO					1.17 2.32	1.45 4.21
S R-SQ	1.45 54.87	1.4 58.27	1.37 59.97	1.32 63.21	1.30 64.99	1.29 64.81

Level 3 - Users density (dependent) with Organisation variables (independent)

- Table 7.16 Correlation of total number of lounge users with the size of organisation and the importance of Informal communication. (Test 3.1.1, and 3.2.1)
- Table 7.17 Correlation of total number of lounge users informally communicating with the size of organisation & the importance of Informal communication. (Test 3.3.1, and 3.4.1)
- Table 7.18 Regression of total number of lounge users with the size of organisation and the importance of Informal communication. (Test 3.1.2, and 3.2.2)
- Table 7.19 Regression of total number of lounge users informally communicating with the size of organisation & the importance of Informal communication. (Test 3.3.2, and 3.4.2)

Table 7.16 Correlation of total number of lounge users with the size of organisation & the Importance of informal communication. (Test 3.1.1, and 3.2.1)

PREDICTOR	Total No. of Lounge users (r =)
Size of organisation	0.907
Informal communication	0.343

- Significant level where $r > 0.31$

Table 7.17 Correlation of total number of lounge users informally communicating with the size of organisation & the Importance of Informal communication. (Test 3.3.1, and 3.4.1)

PREDICTOR	Total No. of Lounge users informally communicating (r=)
Size of organisation	0.896
Informal communication	0.544

- Significant level where $r > 0.31$

Table 7.18 Regression of total number of lounge users with the size of organisation & the Importance of informal communication. (Test 3.1.2, and 3.2.2)

PREDICTOR	Total No. of Lounge users P =	R-sq =
Size of organisation	0.000	82.30 %
Informal communication	0.000	11.81 %
T o t a l		94.11 %

- Significant level where $P < 0.1$

Table 7.19 Regression of total number of lounge users informally communicating with the size of organisation & the importance of informal communication. (Test 3.3.2, and 3.4.2)

PREDICTOR	Total No. of lounge users informally communicating (P =)	R-sq =
Size of organisation	0.000	80.20 %
Informal communication	0.000	11.80 %

- Significant level where $P < 0.1$

Level 4 - Variety of activities with organisation variables

- Table 7.20 Correlation of variety of lounge user activity on size of organisation and the importance of Informal communication. (Test 4.1.1, and 4.2.1)
- Table 7.21 Regression of variety of lounge users activity on size of organisation and the importance of Informal communication. (Test 4.1.2, and 4.2.2)
- Table 7.22 Step-regression of variety of lounge users activity on size of organisation and the importance of Informal communication. (Test 4.1.3, and 4.2.3)

Table 7.20 Correlation of variety of lounge users activity on size of organisation and the Importance of informal communication. (Test 4.1.1, and 4.2.1)

PREDICTOR	Variety of activity r =
Size of organisation	0.020
Informal communication	-0.188

- Significant level where $r > 0.31$

Table 7.21 Regression of variety of lounge users activity on size of organisation and the Importance of informal communication.
(Test 4.1.2, and 4.2.2)

PREDICTOR	Variety of activity P =	R-sq =
Size of organisation	0.832	0.00 %
Informal communication	0.047	3.50 %

- Significant level where $P < 0.1$

Table 7.22 Step-regression of variety of lounge users activity on size of organisation and the Importance of informal communication
 N=112. (Test 4.1.3, and 4.2.3)

STEP	1
Constant	9.429
Informal communication	-0.81
T-Ratio	-2.01
S	2.11
R-sq	3.54

Table 9.1

Step-Regression of Total Lounge Users on Organisation Size, Vending Machine, Bulletin Board, Hot Water Boiler, Sofa and Cross Pathway.
 N=112

Step	1	2	3	4	5	6
Constant	-3.992	-53.759	-78.884	-96.833	-106.569	-108.260
Organisation size	0.343	0.570	0.570	0.610	0.585	0.618
T-Ratio	22.63	16.33	21.66	22.98	24.18	22.55
Bulletin board		-200	-200	-248	-260	-293
T-Ratio		-6.98	-9.26	-10.58	-12.33	-11.86
Vending Machine			50.3	50.3	50.3	51.2
T-Ratio			9.15	9.78	10.93	11.35
Hot water boiler				25.66	39.8	41.0
T-Ratio				4.04	6.33	6.66
Sofa					32.7	31.9
T-Ratio					3.27	5.25
Cross pathway						-13.7
T-Ratio						-2.41
S	46.2	38.5	29.1	27.2	24.3	23.8
R-sq	82.32	87.78	93.11	94.03	95.27	95.52

Table 9.2

Influence of Vending Machine on number of lounge users.

Lounge Code No	Ave. lounge users per observation* without the presence of Vending Machine	Ave.lounge users per observation* with presence of Vending Machine	Percentage of Increase of Lounge users
1-18	16	31	93.75 %
1-21	61	78	27.9 %
2-12	15	22	46.7 %
4-23	21	32	52.4 %
6-10	63	85	34.9 %
1-16	175	200	14.3 %
9-1	276	358	29.71 %

* Total observation of each lounge are 8 observations.

In order to have an *even* whole numbers of lounge users. Decimals below 00.50 were disregarded and decimals over 00.51 will be carried on as 1 to its average founded number.

Table 9.3

Study Findings: Significant predictors of Total Lounge Users, Total Lounge users informally communicating and variety of activities

Dependent Variables	Total Lounge Users	Total Lounge Users Socialising	Variety of Activities
Independent Variables: Physical Design Features by Category:	A-Attractants: 1-vending machine	A-Attractants: 1-vending machine 2-mail box	A-Attractants: 1-vending machine
	B-Behavioural prop 2-sofa	B-Behavioural prop 3-sofa	B-Behavioural prop
	C-Holding Power 3-bulletin board 4-food 5-hot water boiler 6-microwave	C-Holding Power 4-microwave	C-Holding Power 2-microwave
	D-Location: 7-at cross pathway	D-Location: 5-on or near major traffic way	D-Location: 3-central location
	E-Aesthetics:	E-Aesthetics:	E-Aesthetics: 4-visual
	F-Climate	F-Climate	F-Climate

Table 9.4

Study Findings: Physical Design Features with Significant Predicting Power of Informal Communication

Dependent Variables	INFORMAL COMMUNICATION
Independent Variables: Physical Design Features	A-Attractants: 1-vending machine 2-mail box
	B-Behavioural prop: 3-sofa
	C-Holding Power: 4-bulletin board 5-food service 6-hot water boiler 7-microwave D-Location: 8-at cross pathway 9-on or near major traffic way 10-central location
	E-Aesthetics: 11-visual

Table 9.5

Study Findings: Significant predicting power of organisation variables on informal communication

Dependent variables	Total Lounge Users	Total Lounge Users Socialising	Variety of Activities
Independent: Organisation variables	1- Size of Organisation 2- Importance of Informal communication	1- Size of Organisation 2- Importance of Informal communication	1-Size of Organisation

Table 9.6

Study Findings: Significant organisational variables predicting informal communication

INFORMAL COMMUNICATION
1- Size of Organisation
2- Importance of Informal Communication
3- Physical Design Features

Table 9.7

Predictors of levels of informal communication based on Study Findings

ATTRACTING POWER	FEATURES
1- Attractants	- mail box
2- Behavioural prop	- sofa
3- Holding power elements	<ul style="list-style-type: none"> - vending machine - food service - bulletin board - microwave - hot water boiler
4- Location	- central location
5- Aesthetics	- visual contact
6- Climate	- temperature

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