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**THE FLEXIBLE FIRM: A MULTI-DIMENSIONAL
CONCEPTUALISATION AND MEASUREMENT MODEL**

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THE FLEXIBLE FIRM: A MULTI-DIMENSIONAL CONCEPTUALISATION AND MEASUREMENT MODEL*

ABSTRACT

There is wide agreement that economic changes during the 1970s and 1980s have had significant impact on organisations. General agreement has led to debate about the nature, ramifications and organisational response to these events. A major theme to emerge is organisation 'flexibility' and in particular, a continuing interest in what comprises the 'flexible firm'.

This paper firstly, reviews Atkinson's (1987) 'flexible firm' model – a multi-dimensional conceptualisation of labour flexibility, but a uni-dimensional conceptualisation of organisation flexibility suggesting that labour flexibility is but one dimension of 'the flexible firm'. This paper offers a more thorough conceptualisation of the 'flexible firm' by incorporating three additional dimensions representing the traditional factors of production – technology, management and land.

Building upon Atkinson, labour flexibility can be more clearly conceptualised at three levels – the organisation as it intersects with the external labour market; the manpower configuration of the internal organisation; and the skill profile of jobs. Measures include for example workforce numbers, characteristics of the labour force (i.e. permanent, contract, part-time), the fluidity of internal manpower structures, levels of multiskilling and cross skilling.

Flexible technology is often defined narrowly as physical machinery or 'hardware' characterised by 'soft automation' – reprogrammable equipment with the potential to reduce the gap between product design and production process and the opportunity to reduce machine changeover time. This paper develops a broader conceptualisation which defines technology as a system or body of knowledge about techniques – methods employed to accomplish tasks. This includes machinery ('hardware') and human activity systems whose primary function is the imposition of form or order to a set of materials (i.e. raw materials in manufacturing) or to specific human activity (i.e. the implementation of a tax system). Different technologies will vary in the level of rigidity and flexibility imposed in the creation of form (Winner 1977). Measures include speed of response to change (time), variety and customisation of products, services and systems and the accommodation of specialised requirements and tastes (i.e. number of discrete, distinctive outputs).

Both flexible technology and labour provide the potential to modify and transform the technological and manpower configurations of organisation. Decisions about these configurations come from management processes and initiatives, the third dimension of flexible organisation.

This paper suggests a way to conceptualise 'flexible management' that examines how exposed or open the organisation is to the environment – knowledge resulting in exposure rather than protection. This builds on Stinchcombe's (1990) idea that it is important for organisations to be where "news" breaks. Flexible management involves processes which facilitate this ability to ascertain signs about the future and to convey this 'information' to relevant organisation parts. The search for and handling of news becomes the 'information' used in making decisions about the other dimensions of the 'flexible firm'. Measures include examination of activities in forecasting, market intelligence, competitive analysis and factors leading to similarities in form between firms, isomorphism (i.e. normative and mimetic activities).

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The final dimension of 'flexible organisation' to be examined is land. Land is conceptualised as the variation in the extent to which assets are available to the market. Indicators of this dimension include investment in plant (i.e. ownership of land and buildings as opposed to leasing), the degree of vertical integration and other aspects of 'structural inertia' as described by population ecologists.

This paper presents an integrated multi-dimensional conceptualisation of 'the flexible firm' and develops the foundations of a measurement tool. It is based on the four traditional factors of production and integrates a wide literature.

1. INTRODUCTION

The 1990s has revealed a renewed interest in organisation 'flexibility', an issue which has a long tradition in organisation theory beginning with the early contingency theorists (Burns and Stalker 1969; Lawrence and Lorsch 1967; Woodward 1958). This revival of interest emerged largely during the 1980s with Atkinson's model of the 'flexible firm' (Atkinson 1984). This renewed interest is not surprising and accompanied the economic changes of the 1970s and 1980s which represented the shift from economic expansion to stagnation. It is widely claimed that the changes during this period have had a major impact on the organisation of production and the way work is organised. However, debate continues about the ramifications of and organisational responses to these events. An important theme in this debate centres on the concept of organisational 'flexibility' and, in particular, a continuing interest in what comprises the 'flexible organisation' (Atkinson 1984; Pollert 1988a; Pollert 1988b; Pollert 1991; Prowse 1990; Procter, Rowlinson, McArdle, Hassard and Forrester 1994). Central issues in this debate centre on the increased need for the capacity to respond to rapidly changing external conditions and the claim that an increasingly complex environment causes differentiation of organisational form.

Literature in this area tends to focus on singular aspects of organisation flexibility – labour (Atkinson 1984, 1987; Hakim 1987; O'Reilly 1992), technology and production systems (Mathews 1989; Parthasarthy and Sethi 1992), and management processes and strategy (Procter et al 1994). While this suggests that organisational flexibility is multi-dimensional there has been no conceptualisation of organisation flexibility which integrates core organisational dimensions. The concept 'flexible organisation' remains vague and ambiguous making the development of precise measurement models problematic. The aim of this paper is to construct a comprehensive definition of the flexible organisation. The development of a comprehensive measurement model will enable empirical investigation of the extensiveness, antecedents and consequences of organisation 'flexibility'. This paper does not address these empirical questions, but focuses solely on the issues of conceptualisation and measurement.

Four key dimensions or facets of organisation flexibility can be identified in the literature. Three of these dimensions are explicit in the literature – the labour configuration of the firm, the technology of the firm, and the type of 'management' or information processing systems. The fourth facet – 'land' factors which can become organisation inertial forces – is implied in the literature through analysis of inflexibility. This paper presents a conceptualisation of the 'flexible firm' based on these factors through a re-formulation of Marshall's (1958) four 'agents of production' – the economic inputs to the production process: labour, capital (technology), organisation (reformulated as 'management') and land (the 'structural forces of inertia'). These are first described briefly, and then a more detailed analysis of each is presented.

Labour flexibility is conceptualised at three levels – the organisation's transactions with the external labour market; the composition of the workforce; and design of jobs. A firm's flexibility along the labour dimension can be measured by such indicators as workforce size; characteristics of the labour

force (e.g. proportions of permanent, contract and part-time workers); the nature of human resource systems; and the levels of multi-skilling and cross-skilling of the workforce.

Technology is conceptualised along two dimensions: operations and knowledge. This conceptualisation builds on the work of the Aston Group (Hickson, Pugh and Pheysey 1969) and focuses on the workflow and sequencing of activities (operations technology) and on the level of knowledge used in the workflow (knowledge technology). Perrow (1967) provides an approach to the measurement of knowledge technology by measuring exceptional cases in the workflow. This conceptualisation of technology as embedded in equipment, workflow and knowledge rather than just 'equipment' has the advantage of more general applicability and includes service and public sector organisations as well as manufacturing firms. Measures of the flexibility of technology include levels of computerisation of equipment, the interchangeability of workflow, the sequential nature of the workflow, the formalisation of workflow, and the number of unplanned events which occur in the workflow.

Marshall's agent of production 'organisation' is reformulated as 'management'. 'Management' provides the organisation's capacity to respond to 'unstructured problems' – those which cannot be handled by routines or technology. This capacity depends on the extent to which those close to the problem have adequate information and authority to respond to the information effectively. This implies two key dimensions of flexible management – decentralisation of decision making and wide accessibility of information. This definition builds on Stinchcombe's (1990) argument that it is important to be where 'news' breaks, that information must be dispersed and located at key places in the organisation and that information must be acted on (decisions must be made) at the appropriate location in the organisation. This reformulation of 'organisation' builds on the literature which highlights the importance of authority as a critical dimension of organisation structure (Pugh, Hickson, Hinings and Turner 1968; Pugh 1973; Pennings 1975) and on the literature which focuses on the importance of information in rational decision making processes (Simon 1976; March and Simon 1958).

The final dimension of 'flexible organisation' to be examined is land. Marshall's conceptualisation of land refers to "the whole of the material and forces which Nature gives freely for man's aid" (1958, p.85) or the natural resources of a country. This definition is extended to the organisation level and focuses on the organisational resources of the firm. Land is defined as the variation in the extent to which assets are available to the market. The flexibility of land is measured by examining organisation investments which constrain the ability to change or adapt. Building on the work of the population ecologists the land dimension refers to the 'structural forces of inertia' which may constrain organisations from alternative courses of action because of previous investment decisions.

2. FLEXIBLE LABOUR

'Flexible labour' refers to the potential to adjust the quantity (numerical flexibility) and quality (functional flexibility) of the workforce. Numerical flexibility provides the opportunity to change the size of the workforce as demand fluctuates¹. Functional flexibility provides the potential to create different skill combinations depending on varying needs in response to product market conditions. A high degree of both numerical and functional flexibility provides the potential to change how things are done in the organisation (the process), to change what is actually done (the type of output) and the amount of work performed (the volume of output).

The main indicator of a high degree of numerical flexibility is the presence of fluid and changing employment patterns within an organisation. The capacity for numerical flexibility is exemplified in workplaces where there is a small permanent workforce and groups of peripheral workers, either

¹ The ability to do this depends on external labour market conditions.

loosely attached to the organisation or outside the organisation, who can be recruited or shed as required. Increasing flexibility is indicated by a reduction in the number of permanent employees, increased use of contract labour, an increase in casual and part-time employment. In contrast, firms comprising predominantly stable numbers of permanent employees can be characterised as having low numerical flexibility.

Functional flexibility results from the capacity to re-deploy workers across a range of tasks or jobs. This in turn depends on employees with high levels of skill and a broad skill mix. A functionally flexible workforce is characterised by employees who perform a wide variety of complex tasks and is indicated by the range and complexity of tasks covered by job descriptions; by the amount of skill training provided by firms; and by the turnover rates of skilled employees. Broadly, an organisation's degree of labour flexibility can be characterised by the ease with which the patterns and combinations of workers (for example, the workforce size) and the mix of skill (for example, which work roles and which particular work skills are utilised at particular times) can be adjusted, modified or transformed.

Atkinson's model of 'The Flexible Firm' (1984), presented in Figure 1, portrays workforce flexibility in terms of:

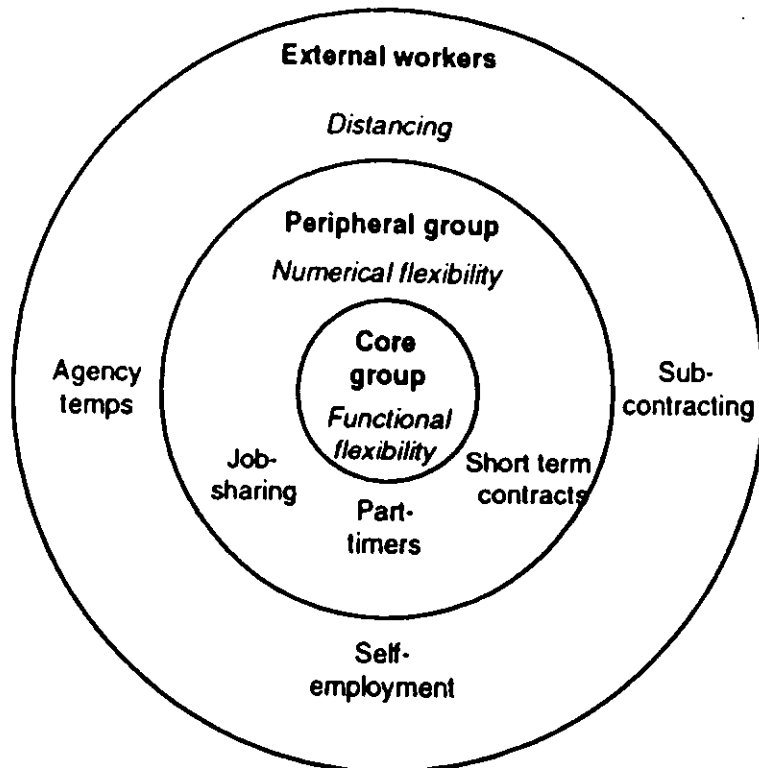
- a small, core workforce with high functional flexibility;
- a peripheral workforce comprising groups of employees loosely attached to the firm; and
- groups of external workers who are brought into the organisation as required.

The size and characteristics of the different components of the workforce, especially the peripheral and external components, can be altered with ease in the flexible firm. Flexibility relates to this potential – the modification of existing workforce characteristics and the ease with which changes can be executed. Factors that denote this aspect of numerical flexibility include: the proportions of employees on one day's, one week's and one month's notice; time taken to bring sub-contractors on-site; time taken to establish task forces or project teams.

In summary, flexible labour can be conceptualised at three levels: the external labour market; the workforce; and individual jobs. Flexibility at the level of the labour market involves the deployment and redeployment of labour (numerical flexibility). It will be reflected in workforce numbers and in the organisation's employment profile, defined in terms of the proportion of staff who are permanent, part time, contract, subcontract or casual. Some industries have traditionally been characterised by flexible labour at the level of the external labour market. Examples are organisations characterised by seasonal demand or production fluctuations such as fruit processors (temporary employees), the construction industry (sub-contracting) and the music industry (self-employment).

Flexibility at the level of the workforce denotes the ability to move employees to new tasks and to put together different combinations of workers' skills. Organisations with a high degree of labour flexibility at this level will have characteristics such as: employees who work with different rather than the same people; fluid internal structures, indicated by loose departmental structures; and high levels of movement of employees between sub-units and departments. The ability to alter the workforce configuration of the internal organisation reflects the level of functional flexibility and derives from high levels of horizontal task integration, vertical functional integration and localised responsibility (Mathews 1989). Horizontal integration, or job 'enlargement', is indicated by broad job classifications where workers can rotate between tasks. Vertical integration, or 'job enrichment', refers to the devolution of planning and policy functions throughout the organisation.

Figure 1: The Flexible Firm



Source: Atkinson (1984) (Modified)

Stinchcombe's analysis of skills in terms of the 'information system' within the individual provides a useful insight into labour flexibility (Stinchcombe 1990). In his view ".....the information system inside the individual is just as complex as the information system of the organisation. Measuring what that system is capable of involves analysing the relationship between the particular complexities or uncertainties of the work to be done and the complexities and skills of the mind and body of the worker or recruit" (Stinchcombe 1990, p.26). Flexible labour must necessarily include a dimension which examines the skill, or information system, required of individuals in their roles as workers or employees. The focus is on the relationship between the complexity or uncertainty of the work and skills of job incumbents. Although the potential to alter and modify skill combinations depends on the degree and range of skills of individual workers, the concern here is with the skills required to perform multiple tasks (skill 'width') and tasks of high complexity (skill 'depth'). Thus, the focus of this dimension of labour flexibility is on the worker-job interaction. The potential inflexibility of 'lean' production is a useful illustration of the worker-job interaction. Lean production works on the principle of minimising the level of skilling required to do the job in order to reduce redundancy. By contrast, having highly skilled workers (who might be over qualified for particular tasks) adds redundancy to the system (and is consequently less 'lean'), but increases flexibility by providing the opportunity to change and interchange the mix of skills required as determined by fluctuations in demand.

Multi-skilling is the most widely discussed component of functional labour flexibility. It is a term used broadly to refer to the skill characteristics of a worker who can perform multiple, skilled tasks. Multi-skilling refers to extending the range of workers' skills so that the workforce comprises broad based skill groups. Job enlargement and job enrichment imply multi-skilling and team based work is ideally based on teams comprised of multi-skilled workers. Consequently, work roles in the 'flexible firm' will be broad and will be performed by a core of multi-skilled workers. The intention of multi-skilling is the creation of a 'flexible' worker who can be deployed to different tasks, applying different skills as

required. Work teams or groups made up of 'multi-skilled' workers provide much more opportunity for modification and change than work groups made up of narrowly or single skilled workers. Cross skilling extends this to ensure that workers are skilled not only in tasks relevant to their own work group in their own work setting, but also are skilled in tasks relevant to other work groups (for example, other production units) in other work settings (for example, other departments).

3. FLEXIBLE TECHNOLOGY

Technology can be conceptualised in a variety of ways ranging from a very broad encompassing definition to a narrow one. There is much variation in the definition of technology and this often creates confusion in its use (Grint 1991; Winner 1977; and Freeman 1977). The narrow definition defines technology as physical machinery or 'hardware', while the broad conceptualisation usually alludes to a system or body of knowledge about techniques – the methods employed to accomplish tasks. Winner (1977) suggests that the primary function of any technology, and the basis of its utility, is to give 'form' and 'order' either to a set of materials (e.g. raw materials in a production process) or to specific human activity (e.g. diagnosing illness). Technology succeeds by imposing a form and order on materials or activities, but different technologies vary with respect to the range of materials to which they can be applied.

The literature which has defined technology as 'hardware' has largely involved investigation of the manufacturing industries. However, others (Hickson, Pugh and Pheysey 1969; Perrow 1967; Thompson and Bates 1957) offer more comprehensive definitions of technology. Hickson et al (1969) integrate earlier theoretical schemes (Perrow 1967; Thompson and Bates 1957; Thompson 1967; and Harvey 1968) and propose a conceptualisation which includes: operations technology, materials technology and knowledge technology.

Technology is conceptualised along two of the Aston group dimensions: operations and knowledge. Operations technology has as its focus the workflow or sequencing of activities in order to take inputs and produce outputs. It includes both "the equipping and sequencing of activities in the workflow" (Hickson, Pugh and Pheysey 1969, p.380). The importance of technology to flexibility relates to the sequential nature of the workflow and to the interchangeability of workflow activities – the ability to interchange the sequence of activities or to change the type of activity. An example of flexible technology in a manufacturing environment is 'soft automation' comprising reprogrammable equipment that provides the potential for opportunities in product design and process. Soft automation uses computers to control machine operations, providing the potential to reduce machine changeover time dramatically, making smaller production runs of discrete products possible at costs which were previously only realised by exploiting economies of scale. In addition, programmable technology can reduce the changeover time from design to production. The separations between the design, production and modification phases of production are broken down, providing the potential to modify, change and improve both design and production processes more quickly (Parthasarthy and Sethi 1992). Soft automation provides the opportunity to exploit variety and customisation (economies of scope)² because of the ability to put different design and process combinations together. This suggests that flexibility refers to the technical and economic feasibility of shifting from one product to another or the capacity of a core technology to produce multiple products.

The focus on both equipment and workflow broadens the conceptualisation beyond the manufacturing environment. As Hickson, Pugh and Pheysey point out:

² Economies of scope are realised as operation and activity costs are reduced across several product units. The focus is on variety and customisation rather than standardisation.

A transport undertaking has equipment (buses) and a sequence of operations (bus routes). An insurance office has its pens, paper, and calculating machines, and sequences of operations in the issuing of policies, obtaining of premiums, and meeting of claims (1969, p.380).

To illustrate degrees of flexible technology using the transportation example above, a bus company would have more potential for flexibility than a train or tram company which is tied to routes along the train or tram lines, while a taxi company is more flexible than a bus company.

Perrow (1967) highlights the importance of technology to organisation by arguing that technology – defined as work done in organisations – is the defining characteristic of organisation. Perrow's conceptualisation of technology focuses on two facets of technology: the number of exceptional cases found in work (few to many); and the nature of the activity which results when exceptions occur, categorised as 'the nature of the problem' (unanalysable to analysable). The Aston group call this dimension of technology 'knowledge technology'.

Knowledge technology comprises the two aspects highlighted by Perrow (1967): the number of exceptional cases encountered; and the nature of the problem solving required to deal with the problem – whether or not the problem can be analysed and routinised or whether the exception will be sufficiently different requiring a unique search process. High knowledge flexibility will be indicated by high numbers of unanalysable exceptions broadly categorised as non-routine.

Measures of technology include indicators of both the operation and knowledge dimensions. Flexible operations technology is indicated by non-sequential, easily adaptable workflow. Consideration of the nature of the 'equipment' will also indicate 'flexibility' and will be indicated by the technical and economic feasibility of using the equipment to shift from one product or service to another or the capacity of the equipment to produce multiple products and services.³

Flexible knowledge technology is indicated by non-routine technology – specifically indicated by the presence of many exceptions during the workflow. These exceptions are different enough each time they occur to make them unanalysable. This type of exception cannot be handled by a routinised search process, but must be handled uniquely in each situation. Particular measures include: the number of exceptional cases; and the number of formal (documented, written down and repeated) routines to handle exceptions.

4. FLEXIBLE MANAGEMENT

A third dimension of 'flexible' organisation is flexible management. Management is distinguished from organisation and is conceptualised as a function providing the potential for the organisation to respond to internal and external demands which cannot be handled through routine processes or procedures. The potential for management response is captured by two facets of management: the concentration of information; and the authority to act on information conceptualised as centralisation of decision making. This definition of management builds on Stinchcombe's (1990) argument which highlights the importance of the news collecting, information processing and decision making structure to organisation 'responsiveness'. The focus of flexible management is on external information gathering, internal information and decision making processes. Stinchcombe (1990) discusses the need for 'news' about the context in which the organisation operates and about which decisions must be made: "The crucial thing for an organisation is to be where the news breaks, whenever it breaks. Information is 'news'

³ In a manufacturing environment this is most likely indicated by soft compared to hard automation. Developments in soft automation are often referred to as flexible automation (FA) or advanced manufacturing technology. For a complete discussion see Mathews (1989).

for the organisation when it is a first appearance of some sign of how the future is going to be, in a respect crucial for the organisation" (Stinchcombe 1990, p.3). Flexible management is indicated by evidence of high information exchange (being where the news breaks) and decentralisation of decision making (the potential to act on news at relevant parts of the organisation).

Flexible management partly involves tracking the environment, forecasting and predicting trends. This information is filtered into decision making about technology (including product design and production) and labour. Numerical labour flexibility depends on flexible management processes that provide the potential to redeploy labour from outside the organisation (the external labour force) when required. Flexible management processes are premised on the exposure of the organisation to the environment, with information systems which search for 'news' of relevance to the organisation as a whole and to its sub-units and information processing and decision making systems which disseminate and act on this information (Stinchcombe 1990).

The importance of information to decision making processes is widely acknowledged (Simon 1957; March and Simon 1958; Arrow 1984). Stinchcombe (1990) argues that the core of organisational structure is information and information processing. The acquisition of information usually reduces uncertainty and increases the rationality of decision making (Simon 1976; Arrow 1984). An aspect of flexible management is wide dissemination of information in the organisation – expressed as widely accessible information. A related aspect of this facet of management is the speed at which information is disseminated in the organisation – the recency of information. Flexibility is increased when the time taken to share information is decreased.

The second facet of management is the level of decision making. The importance of centralisation as a primary dimension of organisation structure has been widely recognised (Pugh, Hickson, Hinings and Turner 1968; Haige and Aiken 1967). The Aston group define centralisation as relating to "the locus of authority to make decisions affecting the organisation" (Pugh et al 1968, p.76). This is operationalised by asking where, identified by the level in the hierarchy, actions were authorised. Haige and Aiken (1967) extend this idea by identifying two indicators of centralisation: the hierarchy of authority as reflected in the ability to make decisions oneself; and participation in decision making about work and policy decisions. This second indicator is identified by measures of localised responsibility⁴. Localised responsibility refers to the devolution of authority and management functions to work groups and teams. Extending localised responsibility usually involves removing a layer of supervision and management and reassigning these responsibilities and tasks to the work group (Mathews 1989). Localised responsibility may impact on numerical flexibility (by reducing the number of permanent employees) and on functional flexibility (by the necessity of the training and skill of the individual worker, multi-skilling, in response to these increased supervisory demands).⁵

An important distinction is made here between centralisation of authority and centralisation of decision making in recognition of the introduction of technically advanced systems which make possible the centralisation of authority while decentralising the decision making authority to act on and execute activities which may be authorised elsewhere (Prechel 1994). This conceptualisation focuses on centralisation of decision making as a distinct variable. Flexible management is indicated by

⁴ Localised responsibility is often described in the literature as a component of the functional flexibility of labour. Largely involving policy and work decisions high levels of responsible autonomy are an indicator of flexible management.

⁵ An example might be devolving the responsibility for quality control to the work team rather than having quality managers and quality 'watchdogs' to ensure quality standards. This usually involves training of employees in, for example, statistical process control standards and techniques. This will increase the functional flexibility of the workforce.

decentralisation drawing on Stinchcombe's (1990) argument that decision making must be carried out at the relevant place in the organisation in order to ensure 'responsiveness'.

The key to flexible management is the potential to be where news relevant to the organisation 'breaks', to convey this news to relevant organisation parts quickly and to mobilise, transform or modify the factors of production in response. Measures which denote the presence of flexible management include the level of market research and surveillance activity (internal expenditure, the use of external material and the use of external consultants); the level of centralisation of market research activity; evidence of high information exchange within the organisation (less concentrated information), measures of localised responsibility and decentralisation of decision making indicated by decision making occurring equally throughout the organisation.

5. FLEXIBLE LAND

The final dimension of organisation to be considered is 'land', conceptualised broadly as the variation in the extent to which assets are available to the market. This conceptualisation extends Marshall's definition of land – "the whole of the material and forces which Nature gives freely for man's aid..."(1958, p.85). This reformulation of land focuses on the extent to which organisations are committed to particular courses of action because the costs of abandonment are greater than the gains from pursuing alternative courses of action. Building on the work of the population ecologists (Hannan and Freeman 1989; Aldrich 1979) the land dimension is indicated by measures of the organisational 'forces of inertia'. These inertial forces are constraints on structural change in organisations and can arise from both internal and external circumstances (Hannan and Freeman 1977).

Indicators of internal inertial constraints include: investment in plant and equipment (high sunk costs); and organisational histories which generate widely held normative agreements. External inertial pressures include: legal and fiscal market entry and exit barriers; and legitimacy constraints including corporate image and prestige and organisational goodwill. As Hannan and Freeman point out, "When adaptive change violates legitimacy claims, organisations incur costs" (1989, p.68).

The flexibility of land is indicated by measures of the internal and external forces which constrain the ability to adapt or change. Flexible land has low levels of structural inertia. Illustrations of higher levels of land flexibility are firms which lease land, buildings and equipment as compared to firms which own land, buildings and equipment; or firms which are less vertically integrated, making entry and exit from markets easier. The land dimension is a measure of commitment to particular courses of action.

6. CONCLUSION

Flexible organisation can be conceptualised by flexible technology, labour and management as depicted in Figure 2. This multi-dimensional conceptualisation is the foundation for development of a measurement framework. Development of a comprehensive measurement model to capture the four facets of organisation will enable empirical investigation of the extensiveness, antecedents and consequences of organisation flexibility.

Figure 2: Flexible Organisation Based on Three Facets of Organisation

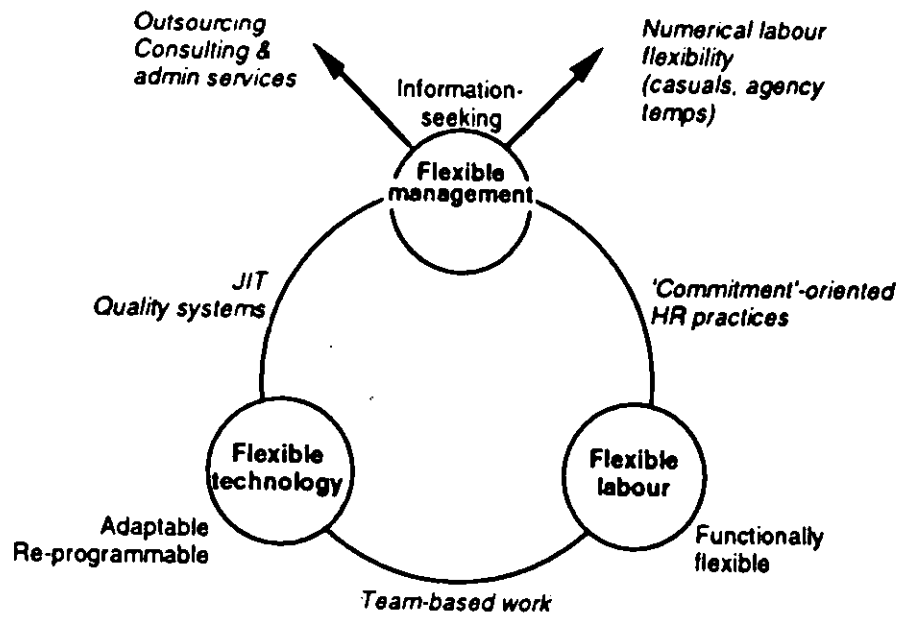


Table 1 summarises this analysis, highlighting key characteristics of each dimension, possible measures and examples of cases which might be predicted to show a high level of flexibility on each dimension.

Table 1: Key Characteristics of Each Dimension, Possible Measures and Examples

Dimension	Characteristics	Possible Measures	Example Cases
Technology	Re-programmable, 'soft' automation	Use of CAD/CAM; Re-tooling time; number of computing personnel involved in production	Machine tool industry; fashion industry; desktop publishing
Labour	Multi-skilled 'core' workforce plus high use of contractors, casuals, agency temps etc.	Ratio of permanent, full-time employees to casuals, part-time etc.; average length of service; ratio of professional to administrative staff; ratio of skilled to unskilled personnel	Construction industry; banking industry; music industry
Management	High information usage; monitoring and surveying rather than controlling and supervising	Research expenditure; average spans of control (high); extensiveness of formal, written policies and procedures (low)	TV news teams; bio-technology firms; consulting engineers
Land	Fluid asset base; low levels of structural inertia; low levels of legal and fiscal constraint	Ratio of fixed to variable assets; applicants to vacancies ratios; expenditure on legal services; 'goodwill' value	Mail order retail and direct marketing operations; internet services; telephone information services

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