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M. L. Jones

University of Wollongong, mjones@uow.edu.au

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Keywords

Sociotechnical Systems, Action Regulation Theory, Activity Theory, Film Industry, Organisation Analysis

Disciplines

Business | Social and Behavioral Sciences

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Putting Action into Sociotechnical Systems Theory – a proposed analysis of the Australian Film Industry using START

Michael Jones
School of Management and Marketing
University of Wollongong
mjones@uow.edu.au

Human organizations are living systems and should be analysed accordingly. The fact that it faces us with the task of analysing forbiddingly complex environmental interactions gives us no more of an excuse to isolate organizations conceptually than the proverbial drunk when searching for his lost watch under the street lamp because there was plenty of light when he new he had lost it in the dark alley
Fred Emery 1969¹

Abstract

This paper proposes a model for organisational analysis based on the conflation of two eminent theories for socio-technical analysis. These theories – Sociotechnical Systems and Action Regulation Theory – have been developed and used in Europe but have received little attention in Australia. The proposed model Socio-Technical-Action-Regulation-Theory (START) provides a comprehensive framework for analysis and investigation.

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INTRODUCTION

This paper provides an in-depth examination of two areas of organisation theory which have not been adequately explored in Australia, especially when the two are combined. The first of these is Sociotechnical Systems (STS) and the second is Action Regulation Theory (ART). Both of these analytical tools have become quite popular in Europe, and in Scandinavia in particular, and while STS was once popular here in Australia, it is now largely overlooked (Emery 1995; Pasmore 1995). When coupled together STS and ART (START) form a multi-dimensional analytical framework capable of providing organisational analysis at two levels. At the macro level the framework provides a broad examination of organisational structure and function, and at the micro level the framework considers individual job design and work process issues. This composite framework will be explored here for its potential use in examining the management and organisational aspects of the Australian Film Industry (AFI).

The START model provides researchers and practitioners with an excellent tool for analysis and optimisation, focussing on the assessment of fit between human systems and work systems. The paper will commence with an introduction to the AFI. This will be followed with a review of the two contributing theories – STS and ART, and will conclude with an overview of the START framework.

¹ Emery, F. E. and E. Trist (1981). Introduction to Volume 1, First Edition. Systems Thinking (Volume 1) selected readings. F. E. Emery. Harmondsworth, Penguin: 13-20.

THE AUSTRALIAN FILM INDUSTRY

The AFI is a difficult industry to study as it is made up of a variety of diverse firms many of which are very small (less than 25 employees). These firms operate in an environment that Fred Emery calls a turbulent environmental context, where work units regularly experience a high number of exceptions or unanticipated situations and frequent challenges and problems (Emery and Trist 1965). An environment of this nature results in the formation of what Perrow (1967) refers to as non-routine organisations. Perrow puts this down to a combination of high task variability and difficult problem analysability. In sum, the Australian Film Industry is an industry which faces rapid and constant change.

The industry employs a large number of people and provides significant income to Australia's economy. It employs more than 16,000 people in 2,174 businesses, and generates almost 1.6 billion dollars per year (Australian Bureau of Statistics 2003). From a survey run by the film industry – the Australian Screen Directors Association (ASDA 2000) – various employment issues emerge as ongoing areas of concern. Of the directors who responded to the survey almost half (46%) earned less than \$20,000 per year, and only 18 percent were able to claim they had full time employment, with a third (30%) relying on financial subsidies from their partner (Jones and Kirsch 2004). Research by Jones (2005) finds that people who manage filmsets face difficulties which exceed those which are experienced by managers in more conventional organisations: “Some of the attributes that characterise these additional tensions are: long hours; irregular work; poor pay; changing environments and conditions; high pressure and short deadlines; large and tightly controlled budgets; creative, volatile and passionate personalities, and more” (Jones 2005, 144).

As well as internal tensions, the industry experiences difficulties with its external environment. A report by the Australian Film Commission (Bean 2000) highlights the need for better and more consistent film funding. In addition, the AFI is facing increased challenges – the film industry has become global, but no longer harbours behind the protection of a Free Trade Agreement. Increased global attraction to Australia has resulted in the advent of large studios which has the obvious benefits of injecting cash into the Australian economy as well as providing Australian crew and talent with increased opportunities for employment and development. It does however threaten the industry's cultural and identity (Dalton 2002).

On the technical side of the film business, the industry has undergone technical change unlike any other, black and white television, and then colour television changed the nature of the industry. Video and then DVD have changed the industry. Now the internet and digital production are agitating film production. The latest technical trend effecting film is ‘convergence’ which will see all media, communications and information merging into a single delivery platform geared for easy, convenient, and interactive access by consumers. With the promise of Interactive TV, video-on-demand and with broadband Internet acquiring ubiquitous status, Australia is on the verge of stepping into a new technological dimension (Jacka 2001). These innovations will bring the burden of management: how will resources be allocated? How will staff across differing functional strata be coordinated?

Faced with change in the past, the film industry has continued to adapt and innovate, and has continually managed to survive, turning changes to its advantage. “Arguably, no enterprise has been more buffeted by opposition from new technologies, and still survived and prospered” (Shanklin 2002).

The nature of employment relations within the industry is also much more difficult in film than in other industries – due to constantly shifting structures and relationships, where individual crews gather and scatter on a project-by-project basis – leading to what Daskalaki and Blair describe as Semi-Permanent Work Teams (2002). As a result the industry faces complex management challenges. Yet the industry continues to thrive with employees working a generous share of the productive hours and employers striving for the next project and subsequent meal-ticket. The ability of this industry to adapt to changing and demanding situations is sometimes miraculous, resulting in evolving management styles which are often years ahead of other industries. Researchers have gone as far as claiming that the Film Industry is the “vanguard of future employment practices” (Blair, Grey et al. 2001).

These constants threats, changes, and tensions have not been without their costs, especially to the independent sector. Creativity is becoming stifled, and art is making way for commerce, and the increased pressures to do more with less are leading to greater incidents of personal and occupational breakdown (Maddox 1992). What the film industry needs is a greater understanding of the management concepts and skills which are best suited or adapted to meet the needs of this unique industry. Current managerial and organisational research has tended to bypass this area of business with only a few research programs taking any interest (Blair 2000; Starkey, Barnatt et al. 2000; Cunningham 2002).

This paper will propose a model for investigating and analysing the Australian Film Industry using the START framework. The research will focus on the social and technical aspects of film management. The framework explicated here will provide the basis for future organisational analysis in this industry and in other industries.

Management research in the film industry, as is highlighted by Blair et al (2001), would also provide immense benefit to Australian business in general, as the film industry is often seen to lead other industries in terms of pioneering new and alternate management styles.

SOCIOTECHNICAL SYSTEMS

STS has its origins in the Tavistock Institute of Human Relations with Trist and Bamforth (1951), and Rice (1958). It grew as a result of apparent short-comings in the previous eras of management. Scientific Management, popularised by Frederick Taylor, was focused harshly on the mechanics of management and organisation, and with its analytical approach to work assessment and its lust for control over the subjective aspects of worker behaviour, tended to ignore the human side of enterprise. The next landmark era of management, the human relations movement, focussed more on the human side, omitting, for the most part, the technical considerations of enterprise. Most of the credit for this new 'humanistic' style of management goes to the work of Elton Mayo and Fritz Roethlisberger who realized the strong connexion between social interaction and work performance in their 'Hawthorne Studies' at Western Electric. STS attempts to find a middle ground between these theoretical movements by focussing on the simultaneous satisfaction of both human and technical elements of enterprise (Emery and Trist 1981; Morf and Weber 2000).

Trist's group believed that work behaviour could be influenced by the context in which it was immersed, the sociotechnical perspective evolved as a natural outcome of this, especially as technology was observed as one of the strongest factors affecting work behaviour (Emery 1993; Pasmore 1995; Katsioloudes 1996). Through their research Trist and Emery discovered that the ubiquitous 'improvements' that were occurring through enhanced innovation at the time were having large effects on the social system, disrupting equilibrium, and reducing the gains originally intended by the technology (Appelbaum 1997).

The theoretical development of STS began with a study of a coal mining operation at Haighmoor, in Great Britain. At the time the country placed great demand on the reliable supply of coal, but the industry was suffering through poor productivity, frequent occasions of poor occupational health and high injury, and incessant industrial action. Coal extraction was becoming increasingly mechanised, but productivity was unable to keep up (Trist 1981). Due to its physical orientation the mine in Haighmoor did not easily lend itself to the usual 'assembly line' approach. Instead the miners at Haighmoor developed a team-based approach. The work structure and mechanical aids were designed by the workers for the workers.

Trist discovered that this type of *ad-hoc* system coupled with continual worker developed innovations could improve labour efficiency. "Haighmoor was far safer, and far more productive, than any other mine" (Kleiner 1996). In explaining the advantages, Trist noted seven systemic differences. *First*, work design should comprise sets of activities rather than individual jobs. *Second*, the work group should be the functional centre, not the individual job holders. *Third*, the work system should be governed through internal regulation (self-managed) rather than by external regulation (supervisors). *Fourth*, the underlying design philosophy should be based on a redundancy of functions rather than on a redundancy of parts (multi-skilling versus specialising). *Fifth*, work should not be limited to prescription; work should tolerate individual discretion and creativity. *Sixth*, the individual should be viewed as complementary to the machine rather than as an extension of it; and *seventh*, the variety of work tasks should be increased allowing individual and organizational learning to flourish (Trist and Bamforth 1951; Trist 1981).

The next large application of STS design occurred in India in the Ahmedabad Calico Mills. A. K. Rice consulted with the Mill's management merely suggesting an idea of a team-based design and the wheels were put into motion, literally, overnight. An experimental loom shed was built with majority input from the workers. The design was to utilise self-managed multi-skilled teams who would be responsible for the entire operations and maintenance of a bank of looms. As in the case of Haighmoor, the sociotechnical design was far more superior to traditional operations in other sheds, which exhibited a more traditional division of labour work design. The experiment furthered the development of STS by confirming the findings of Trist and adding three new concepts: *Eighth*, worker relationships have important effects on productivity; *ninth*, groups will become internally cohesive, but in cases where individuals won't 'fit in' the design must be flexible enough to accommodate these individuals in other groups; and *tenth*, inequities in pay and status within a group make self-regulation by group members more difficult (Trist 1981; Miller 1993).

While the studies in Britain and India were progressing, Emery was busy at the Tavistock Institute conceptualising theories, and in 1959 put forward the first generalised model of the dimensions of the social and technical systems (Emery 1959). Drawing heavily on open systems theory, Emery theorised the nature of technical systems, social systems, and the work structures that hinge these systems together. From his work on open systems theory, Emery linked in a complementary set of criteria: *First*, a manager should concentrate on managing the boundary conditions of the enterprise, inducing resource exchanges between the organisation and

the environment through the co-variation of internal and external processes relying on the self-resolution of errant internal processes. *Second*, the organisation seeks to maintain a steady state through its interdependence with its environment, without the necessity of derived equilibrium, which is a state achieved only by closed systems. *Third*, the organisation maintains constancy of direction, which overcomes the dynamics of internal turmoil, and external change, and in its forward progress it maintains an optimum rate of progress. *Fourth*, management should work to ensure congruency between the capacities of the organisation, both actual and potential, and those of the environment. *Fifth*, the enterprise is self-regulated to the degree that demands for excessive quantities of effort are matched with timely and sufficient supplies of energy. *Sixth*, the preceding conditions rely on a clear state of autonomy and selective interdependence of all subsystems in order to achieve the desired steady state (Emery 1969).

An organisation's technological system creates demands for a *work relationship structure* which comprises both sociological and psychological elements. The sociological elements exposit how an individual or group fit into the work environment. The first sociological condition put forward by Emery (1993) is *occupational role* which serves to identify the individual's location and identity within the work relationship structure, and their function in relation to the production process. Added to this dimension is a second dimension which specifies that *task interdependencies* are co-related to the role relationship rather than to interpersonal relationships, thus we find that social relationships will form to support the occupational task, rather than the other way around. A third dimension concerns *Coordination* and *Control* – the social system is at the mercy of the technical system, in that changes to the latter will affect the former, while a converse relationship (social change affecting the work structure) is less likely to have any lasting effect. In addition, the greater the level of task variance in the work structure the more control and coordination is required. Thus, an environment which has a large amount of flexibility or change would require a greater amount of supervision, with greater levels of reward or punishment needed to be imposed, as both the traditional methods of control 'reward and punishment', as well as the modern ideologies of 'influence and persuasion', are of little appeal to a cooperative and mutually productive environment. Emery suggests *self-governing work groups* as a more desirable method of dealing with individual control and coordination, this also has the advantage of freeing first-level supervisors to coordinate between groups. "*The primary task of the supervisor is to manage the immediate boundary conditions of the worker/task relation and thus relate them to the larger organizational structures*" (1993, 176)².

The realisation that the labour supply within organisations comprises whole people, each one individual and unique, is perhaps the real challenge and advantage of STS. Humans bring complex psychological baggage into their environment, like personality, culture and idiosyncrasies which must be accommodated to ensure proper integration and mutually beneficial production. While the work task requires something of the individual, so too does the individual require something from the task. In solving this conundrum through the design of a *work relationship structure* which is flexible and sophisticated enough to provide for the capriciousness of individuals, the organisation is able to garner more from their workers, and will foster greater mutual satisfaction and reduced alienation. Emery (1993, 178) suggests the following criteria should be satisfied:

- Performance of the task itself satisfies some psychological needs of the individual.
- Performance of the task is not in itself satisfying but it is an unavoidable prerequisite to achieving other psychological satisfactions (i.e. it has means-characteristics) or avoiding other more unpleasant conditions.
- Performance is induced by demands perceived to arise from the task itself (i.e. it arises from "*task orientation*").³

While it is not always possible to satisfy these needs, in fact a very small minority of people work in such utopian conditions, the STS design is a positive movement toward seeking some satisfaction relative to other more conventional models. The practical aim of the work design is to achieve what Baldamus (1951) calls "dull contentment", a sort of borderline satisfaction, prevalent in industry. The third of these criteria is *task orientation* which relies on a psychological connection between the worker and the task, where the task will implicitly induce strong forces within the individual for a commitment toward job completion. Also effecting task orientation is the structure of the task. A task which is either too complex or too simple will result in suboptimal performance. A task which is structured between these extremes will provide opportunity for growth and motivation without the need for significant extrinsic control. One final consideration regarding the psychological side of the human-work interface is *alienation from the product of labour*, the enterprise must work to provide individuals with ownership of their process and their productive input, and over the entire operation if feasible.

² Emphasis original.

³ Emphasis added.

Based on these guidelines, the STS work system is a cooperative of two independent but correlated systems, the social system and the technical system. One cannot function without the other; one requires the other for the transformation of inputs into outputs. “Their relationship represents a *coupling* of dissimilars that can only be jointly optimized. Attempts to optimise for either the technical or the social system alone will result in the suboptimization of the socio-technical whole” (Trist 1981 51)⁴. The system should comprise collections of socio-technical units, usually self-managing groups, consisting of eight to ten workers who possess the skills and authority to control the operation of their technology.

In an optimum design each part of the system will have its own sub-purpose which will complement and augment the aims of the overall system. The parts should be self-managing to the point that they can cope with problems by rearranging their own use of resources and by promoting functional redundancy and labour selection, and would seek to optimise a reciprocal benefit between the needs of the task and the needs of the human (Emery 1974).

The social system must, therefore, comprise three basic principles. *Principle I*, the best productive design will ensure the goals of the parts, or subsystems, reflect and advance the goals of the whole. *Principle II*, management of the subsystems will be autonomous and self regulating and will ensure the maintenance of a steady state in equipoise to changes in the environment. *Principle III*, the system enlists a degree of multi-skilling in its constituents such that they have the requisite properties suited to the demands of the position they occupy (Emery, 1981).

A final feature of STS is Emery and Trist’s discussion on “The Causal Texture of Organizational Environments” (1965), which based on earlier work of Pepper (1934), and Tolman and Brunswick (Tolman and Brunswick 1935) characterises four schemes of organisational behaviour based on the complexities of their environment. They note that as organisations become increasingly sophisticated, they and their environments become subject to change at increasingly frequent rates and therefore the environmental context within which they exist becomes less stable over time. A means of redefinition has been conceived to provide a more stable platform for social analysis. This model comprises four ideal types of organisational environment, these are:

1. The *placid, randomised environment*. The placid environment is one which applies its rules universally throughout the environment. Goals and bads are relatively unchanging and are randomly distributed. An organisation once 'adapted' to its environment should maintain its momentum. Evolution is through trial and error and the optimal strategy is for the organisation to do its best within its natural constraints (Macintosh and Baker 2002).
2. The *placid, clustered environment* is similar to the first environment. In the clustered environment the goods and bads while relatively unchanged are more clustered, and these clusters represent opportunities or threats. The organisation must develop strategies to take advantage of the opportunities and avoid the threats. Organisations operating in this environment tend to become hierarchical and adopt a centralised form of control, and tend to expand when growth opportunities arise.
3. The *disturbed-reactive environment*. This is a more complex causal texture of the environment. While still relatively stable and predictable, it is dynamic. This environment acknowledges the tactical strategies of others (competitors) who share the environment, where the actions and reactions of each must be taken into account. The organisational equivalent would be the oligarchy, where competitors exist, but competition is not ruthless. Companies will hinder others movement but will not impede them. At this level emphasis is given to bureaucratic structures with power concentrated at the top of the hierarchy. As such change is resisted and knowledge becomes fragmented.
4. The *turbulent environment*. This environment is the most dynamic, but not just from the interaction between organisations, but because the very ground shakes, what Emery and Trist describe as “turbulent fields”. This *field turbulence* derives from systemic effects, usually resulting from the enormous pressure of momentum the organisation has unleashed to get to this level. The authors refer to these forces as *autochthonous*⁵ *processes* where rules are constantly changing in a random and unpredictable manner. This environment is indicative of conditions in the AFI where employment is discontinuous and organisational dynamics are on the one hand critical, and on the other strained. Organisations in this environment find “a gross increase in their area of relevant uncertainty. The consequences which flow from their actions lead off in ways that become increasingly unpredictable” (Emery and Trist 1965 26). Turbulence is thus characterised by complexity as well as rapidity of change in causal interconnections in the environment.

⁴ Emphasis original.

⁵ Autochthonous, in Greek myth, means ‘children of the soil’ which means they have belonged to the land eternally. These are gods of chaos and catastrophe who shake the earth to wreak havoc Parada, C. (1993). Genealogical Guide to Greek Mythology, Coronet Books..

Emery and Trist conclude that when members of a type four organisation work together they can affect control mechanisms which will moderate the chaos and uncertainty. Individual organisations that are not socially and technically aligned will have difficulty adapting successfully. Taylor and Felton (1993) state that STS provides organisations with flexible means of responding to chaotic and turbulent environments.

THE DARK SIDE OF STS

Despite all of the aforementioned benefits of STS, it has not enjoyed a large practitioner following. After 50 years of work on STS, Trist reflected on its relatively poor diffusion, observing that scientific management and its inherent control-oriented paradigm of management was maintaining its strangle hold, while more democratic systems like STS were relegated to a more experimental status (Trist, Murray et al. 1993), and even these are facing a steady decay in the face of stolid authoritarianism. "But whatever history may say about the paradigm he helped to create, it is clear that his basic challenge is still relevant: humanism and effectiveness can and must be thought of as linked together in the design of work and work systems" (Pasmore 1995 19). One of the more burdensome weaknesses of STS intervention regards the adjustments made by practitioners to modify the operation of their organisation – most take the technical side of the operation as a given which cannot or will not bear adjustment, therefore the default intervention rests with changes in the social system. Consequently, the model is seldom seen as a tool for 'joint optimisation', as the social system alone offers the more convenient system for tampering with, and blaming for organisational dysfunction (Katsioloudes 1996).

A more obvious weakness of STS is in its practical application. As the systems have equal regard to both the technical and social dimensions of the organisation, the practitioner requires skills equal to the task of analysing and understanding both of these extreme disciplines, therefore one must have the skills of a sociologist and an engineer to be an effective enabler of even the most fundamental sociotechnical alignment (Cherns 1978).

ACTION REGULATION THEORY

ART is a cognitive theory which is well known in Germany and Scandinavia, but it is little known in English-speaking countries (Greiner, Krause et al. 1998). It is based upon a conflux of Lewin's Field theories and the fundamental Activity Systems Theories (AT) proposed by Leont'ev and Vygotski. However, where AT looks at *activities*, which comprise sets of actions, ART focuses on *specific actions*. An action is described as goal-oriented behaviour (without a goal there is no cause for action), which is coupled with an inherent feedback cycle, which allows for the concept of action as a pseudo-iterative process. ART is concerned with the structure of goals and sub-goals, which are guided within a hierarchical framework of plans, monitoring, and feedback. These components of action are regarded as links between mental representations and the material and social environment. Thus ART can be seen as a part of AT (Frese and Zapf 1994; Morf and Weber 2000).

A practical analogy of action in this context could be a situation where on a film set the sound technician requires a clearer sound image, he would instruct the *boom operator* to move the microphone closer to the object for a clearer audio recording. Referring to figure 1, the boom operator will *develop the goal* (and decide amongst other competing goals) – **I want to move the microphone closer to the birds' nest**. Next she will *orient* herself by collecting information about the situation and capturing and analysing relevant signals leading to a probable prognosis – **The wind is blowing and the branch is moving**. The signals relate to acquired models and knowledge the grip has gained through experience and training. The analysis will then lead to *generation of plans*, while this is usually constructed before the action is executed, it is not always comprehensively conceived, usually it is a simple sub-goal, with various levels of contingency – **I will rest the boom on the upper branch - if the branch is too flimsy I will support the weight by readjusting my balance**. *Decision* is usually a subconscious commitment to execute the plan. It may include an iterative process of Test-Operate-Test-Exit (TOTE), where the process between plan and decision are being continuously fine-tuned. *Execution and monitoring* is the point at which the subject interacts with the object, and both positions are altered. **The boom operator moves the microphone closer to the nest**. *Feedback* completes the action. It provides the subject with information regarding progress toward the goal, and can be extrinsic or intrinsic. **The sound technician receives an improved sound level and advises the boom operator that the position is good**.

Therefore according to ART, an action is stimulated by a goal, which motivates the actor toward action, which consequently requires the anticipation of future conditions and results in a need for a plan of action. The process is complete with feedback providing a basis for comparison and learning (Waldenstrom, Josephson et al. 1998).

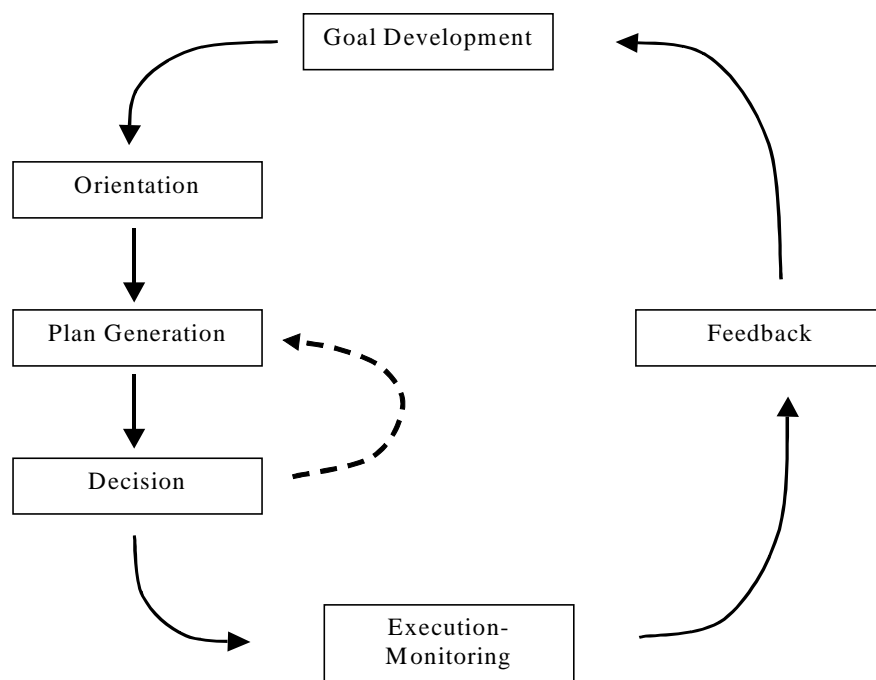
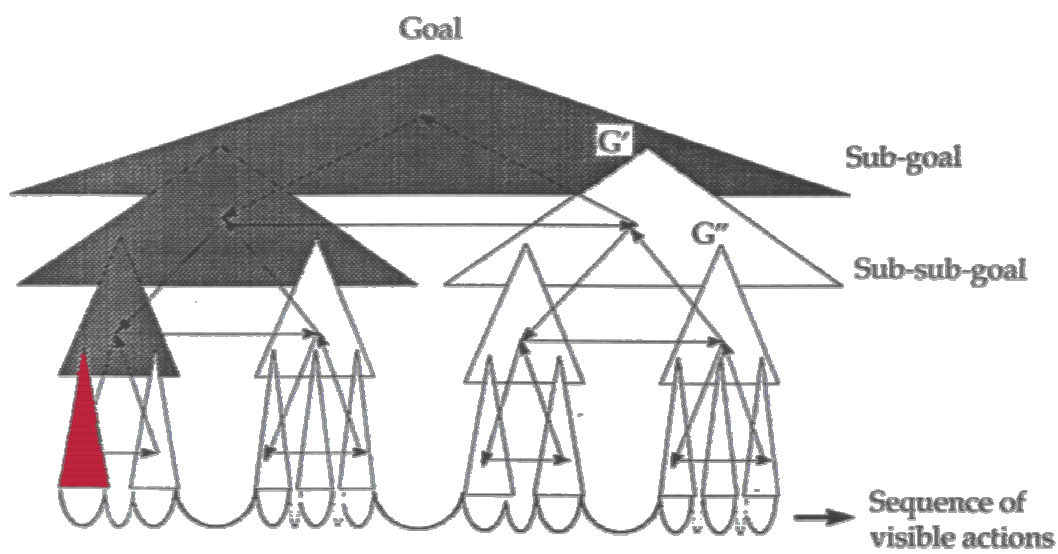


Figure 1 The Action Process.
Based on Frese and Zapf (1994)



From "The Model of the Hierarchical-Sequential Organization of Action" by W. Volpert. In *Cognitive and Motivational Aspects of Action* (p. 39) by W. Hacker, W. Volpert, and M. Cranach (Eds.), 1982, Berlin: Hüthig Verlagsgemeinschaft GmbH. Copyright 1982 by Hüthig Verlagsgemeinschaft GmbH. Reprinted by permission.

Figure 2. The Hierarchic-Sequential Regulation of Action

While the above describes the ‘action’ component of ART, ‘regulation’ comes from the structure of actions and possible alternatives. This is because the actions are structured in a hierarchical system. Figure 2 illustrates this process of regulation, taking into account the hierarchic-sequential manner of action regulation. Firstly, a goal is set. Then, descending the hierarchy, sub-goals are devised leading to actions. Completion of a set of actions will satisfy a sub-sub-goal or a sub-goal, which will eventually achieve the major goal. A parallel can be made with the human body where a command travels from higher levels (the intellectual level) to lower levels (the sensorimotor level).

The real value of ART is with its ability to measure stresses or errors in the work system. Assuming individuals are active and goal oriented, and they dynamically engage with their environment. Any failure to achieve a goal, which is potentially unavoidable, is due to an error. As human error is avoidable, errors analysed through ART are assumed to be systemic, and are due to misalignments within the sociotechnical system. Such sociotechnical flaws are known as work hindrances as they tend to disrupt stable activity in the average person resulting in stress factors. These stress factors are characteristics of the work task that hinder the regulation of mental processes because of poor technical or organizational alignment, such design flaws include barriers to work, excessive time constraints, boredom, technical problems, ergonomic problems, scarce or restricted resources, environmental factors, or organisational short-comings. Work characteristics such as these will impede the task at hand, and force workers to try to cope with the situation, and will induce fatigue and poor occupational health and efficiency.

ART, like STS, focuses on the whole system, and on the cognitive abilities of workers and their ability or inability to cope within the organisation. Thus when ART is coupled with STS, forming the framework for START, we have a rich analytical model for the assessment of organisational well-being (Frese and Zapf 1994; Greiner, Ragland et al. 1997).

THE START FRAMEWORK

The analytical features of STS and ART are enveloped in a comparative framework conceived as START – Socio-Technical-Action-Regulation-Theory. The combination of these two theories provides an excellent diagnostic tool for examining organisations across functions and across strata. The model is a similar framework to a framework forwarded by Strohm and Ulich in Norway, which they called PTO (People-Technology-Organisation) and much of their initial ideas guide the development of this model (Strohm and Ulich 1997; Strohm and Ulich 1999).

START provides a comprehensive tool for analysis and evaluation of firms working in the film industry. The analysis is undertaken across four levels, see figure 3. At the *level of the organisation* or the *film production company* organisational elements are evaluated, these include production strategies and requirements, personnel structure, implementation of technology, vertical and horizontal alignment and integration of sub-units, quality management, reward systems, and job design. Orientation with regard to the environment of the enterprise is essential for analysis and evaluation at the *level of project*. At this level, the system considers functional elements, for example, the forms of division of labour, and the completeness of primary tasks within the various organizational units are evaluated. At the *level of the production crew* the degree of freedom for collective regulation of work and working conditions are assessed. Finally, analysis at the *level of the individual* demands that employees' own subjective evaluations of the work situation and working conditions is included (Strohm and Ulich 1999).

Thus working units as well as the overall organisation are studied to determine design effectiveness and efficiency. Additionally, the quality of working conditions are assessed, determined by the degree of sociotechnical optimisation of work tasks and work structures. Analytical outcomes will, ideally, recommend a more efficient fit between the “development of the employees' qualifications, the implementation of advanced technology as well as the design of the work organization” (Strohm and Ulich 1999).

By using START many of the issues and problems the industry faces and the management methods that have evolved to deal with them can be observed and understood. Analysis is able to produce a comprehensive profile of the strengths and weaknesses of an organisation, and allows the conception of design criteria for integral restructuring in the sense of sociotechnical optimisation.

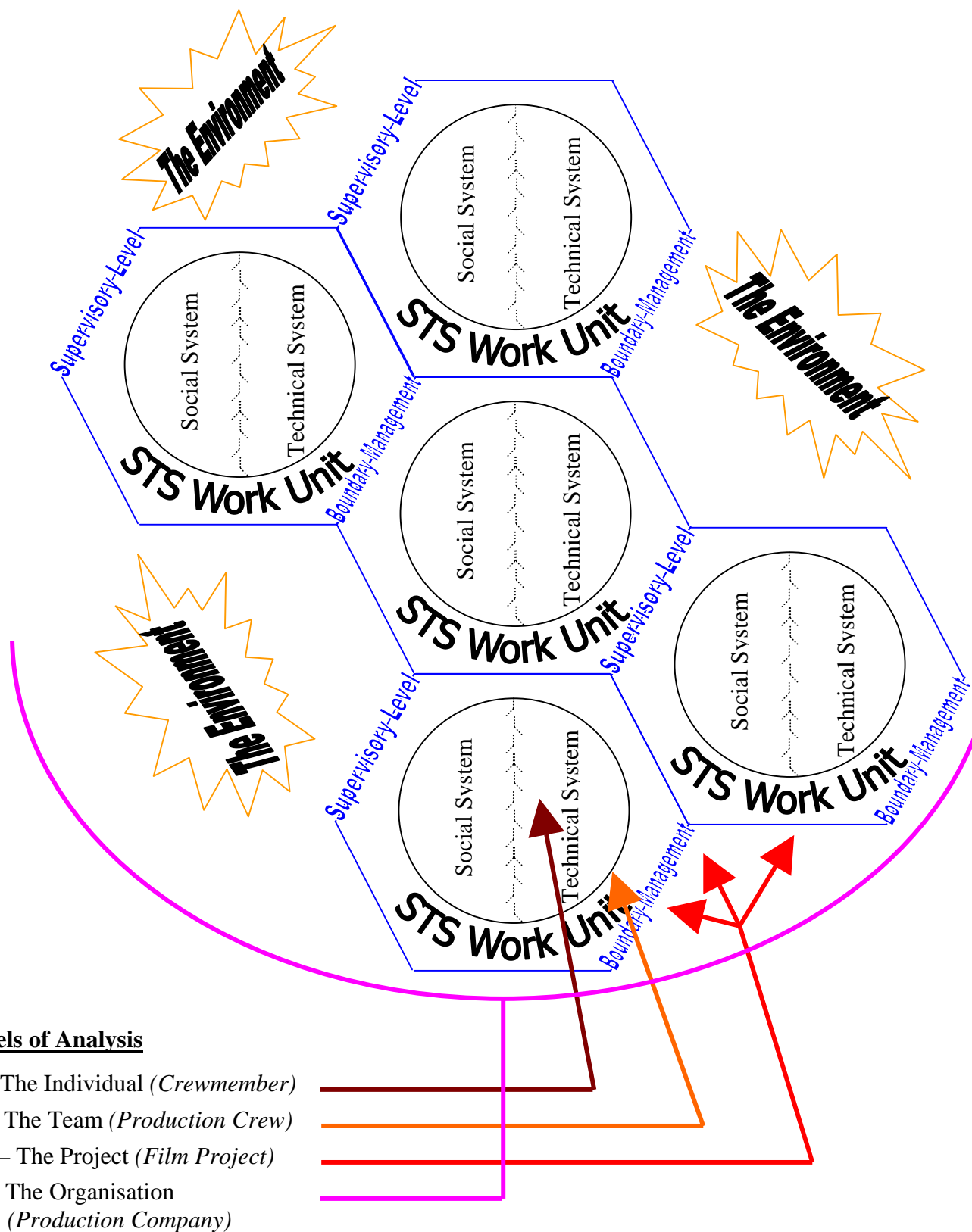


Figure 3. The START Framework with its four levels of analysis.

CONCLUSION

The Australian Film Industry is unique compared to other Australian industries; it faces many challenges both technical and social in nature which are more easily overcome in other businesses. Comprising the analytical elements of sociotechnical systems and action regulation theory, START is an ideal model with which to analyse this industry as it focuses on discovering inherent design weaknesses and flaws in these social and technical systems, and providing guidelines for achieving greater social and technical alignment.

The next step in utilising the START framework is to develop the analytical instrument based on the diagnostic schema prescribed by the two theories.

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