"Computer Technology Providing Leadership and its Effects on Teams and Subordinates in Call Centres"

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Abstract

With advanced computer technology pervading the contemporary workplace the study of leadership may need to be re-examined. In addition to leadership from a supervisor, other leadership sources are now apparent. Kerr & Jermier (1978) and Podsakoff’s (1994) revised ‘Substitutes for Leadership’ theory argues that apart from the hierarchical supervisor leadership may be sourced from characteristics of the individual, the task and the organisation. Another source of leadership may be the computer technology employees use. Using data from 45 call centres, 45 managers, 93 team leaders and 553 agents, this study investigates the degree to which computer technology provides leadership and its relationship to team performance and subordinate satisfaction, commitment, performance and intention to turnover.

Introduction

Call centres are a new workplace. In Australia there are about 4000 call centres, employing over 250,000 people. The industry grows at a rate of about 20% per annum and domestically has a net operating value of AUD$8 billion (ACA Research, 2001). Call centres are characterised by employing workers who handle multiple in-bound or out-bound calls per day, a high level of customer interaction (Feinberg, Kim, Hokama, de Ruyter, Keen, 2000; Burgers, de Ruyter, Keen & Streukens, 2000; Bennington, Cummane & Conn, 2000), continuous monitoring of performance (Kinnie, Hutchinson & Purcell, 1999), minimal interaction with peers or supervisors (Wallace, Eagleson & Waldersee, 2000), a low level input to change or improve work processes, large spans of control (ACA Research, 2001) and high stress and turnover levels (ACA Research, 1999; Hallis, 2001).

Call centres are also typically high-technology workplaces. The industry classifies computer technology into five generations ranging from those centres which have basic call routing capabilities (automatic call distributor-ACD) to those which incorporate multimedia, advanced switching capabilities including internet, voice and data integration to the desktop, management information systems (MIS), integrated voice recognition (IVR), computer-telephony integration (CTI) and advanced customer contact management desktop software (Hallis, 2000). The technology performs several key functions that affect the worker. These include the allocation and scheduling of work, monitoring of performance, providing feedback on quality and targets achieved, highlighting errors, provision of product, service and customer information, CRM (customer relationship management), highlighting training needs

and on-line training (ACA Research, 2001). The technology also provides workers and management with immediate feedback on other call centre KPIs (Key Performance Indicators). These indicators include workers' availability to take calls (hours per day available to answer calls, typically 80%), adherence to schedule (percentage of time the worker adheres to the availability measure), speed of answering the phone, average call talk time, average after call work time and abandon rate (percentage of callers who hang up).

Despite researchers describing call centres as high technology environments (Mehrotra 1997; Green 1996; Matheson 1993), apart from benchmarking studies (eg. Hallis, 2000; ACA 2001) there has been little research into the relationship of technology to leadership and performance. The purpose of this study was to investigate the effect of technology on leadership at the team and subordinate levels in the call centre environment. This paper presents the results of a descriptive study analysed at team level as well as investigating the moderating effects of technology on leader behaviours and subordinate criterion.

Background Literature

Call Centre Management: Much of the call centre and service management research has focused on emotional labour (Ashforth & Humphrey, 1993; Peccei and Rosenthal, 1997; Leidner, 1996) and control systems in call centres (Fernie & Metcalf, 1999; Frenkel, Korczynski, Sire & Tam,1999; Taylor & Bain, 1999). The emotional labour studies emphasise the importance of the behaviour of the employee in conducting a service transaction. They show that staff in call centres are required to display certain

behaviours that meet specified criteria (MacDonald & Sirianni, 1996) and to work to strict levels of performance. To ensure performance levels are maintained, in most call centres an invasive monitoring system presides.

To monitor employee behaviour and performance call centre management have introduced advanced control systems, such as call monitoring and screen 'drop-ins' (ACA Research, 1998). Call monitoring involves a supervisor regularly listening in on a call taken by an employee, rating their performance and then providing feedback. The employees do not know when they are being monitored. Screen drop-ins involve the supervisor remotely tracking the computer screens and entries to the screens the employees have used. Errors and wrong screen usage will be brought to the attention of the employee. Also, the supervisor will receive daily performance statistics on each employee detailing their performance on indicators such as availability, adherence, average speed of answer, talk time, wrap-up time and after-work time. Employees are given a target to work to and if they are performing at sub-standard levels they will be counselled or coached.

The computer systems monitor and report on most aspects of the employees' work. In a previous study one call centre agent stated, "The computer knows everything about me, it knows when I am here, what I am doing, when I go to the bathroom, everything" (Wallace, et al, 2000). Some academics have gone so far as to state "…the tyranny of the assembly line is a Sunday picnic compared to the control management can exercise in computer telephony" (Fernie & Metcalf, 1997). Fernie & Metcalf (1997) apply a Foucauldian adaptation of Bentham's prison Panopticon to infer call centres as an electronic Panopticon. Others suggest call centres employ

workers who essentially are so controlled that they have "..an assembly line in the head" (Taylor & Bain, 1999).

Despite Fernie & Metcalf's (1997) Foucaldian comments their study showed that those centres which had a regular employee monitoring and appraisal system had better outcomes and that there was a closer link between monitoring and pay systems than performance and pay systems. In the qualitative research phase of a previous study a call centre employee commented, " We don't really mind being monitored, it is good to get immediate feedback on how we are going" (Wallace et al, 2000).

Frenkel, et al (1998) also argue that call centre employees are subjected to "info-normative control". This control comprises the informating properties of information technology which generates performance data reporting on conformity to procedures, policies and standards and facilitative supervision. It also comprises defined expectations of work standards, coaching and technical and psychological support by management. Wharton (1996) also argues that call centre staff are highly controlled and work with a high degree of inflexibility. Leidner (1996) goes as far as suggesting that the high level of interaction with customers provides another control source. Clearly, call centres are highly controlled environments.

Do these control systems also provide the call centre employee with leadership? Yukl (1994) states that leadership and management of employees should be treated as the same construct. He describes specific leader behaviours including planning, clarifying, informing and monitoring. He suggests that managers who keep employees informed tend to be more effective leaders than those who do not. He also argues that

monitoring indirectly affects a leader's performance by applying recognising, rewarding, clarifying and problem solving behaviours to assist the performance of a subordinate. Larson & Callahan (1990) found that performance increased on a task that was closely monitored but not on a task for which there was little monitoring. The effect on performance was greater when monitoring was followed by praise or criticism but it was even greater when there were no associated consequences for the worker. Komaki (1986) also found that managers who did more monitoring were more effective. Komaki, Desselles & Bowman (1989), Yukl et al (1990) and Jenster (1987) all found a relationship between monitoring, employee effectiveness and a leader's performance. If these monitoring, control or computer systems are inspiring or influencing an employee to greater performance or to reach a goal that they may not have achieved otherwise then these systems may be regarded as providing leadership to the employee.

Technology in Call Centres: Socio-technical theory argues that if there is a fit between the social and technical systems, there will be a multiplicative rather than additive effect on performance (MacDuffie, 1995). A study by Mankin, Cohen & Bikson, (1996) suggest that a high level of technology creates independent workers who are free from the interference of the supervisor. In this way workers may be autonomous and have responsibility for meeting customer demands. It is also argued that self-regulation provides an opportunity structure for learning, problem solving, setting goals and allocating tasks (Batt, 1998). Ancona (1990) suggests that technology also allows teams the responsibility to co-ordinate and share information, gaining more knowledge of the work process (Batt, 1998).

From an industry perspective, call centres have developed descriptions of generations of technology (the same classifications as used in this study), from basic to advanced. Generation 1 incorporates automatic call distributors (ACD) and Generation 5 incorporates ACDs to advanced multi-media software, voice recognition and customer relationship management systems. These definitions follow (Hallis, 2000):

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Insert table 1

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In summary, the limited academic work addressing call centers has focused in particular on emotional labour (Doucet, 1999;Taylor, 1999) and control systems (Kinnie, Hutchinson & Purcell, 1999;Frenkel, et al,1998). Other areas of academic interest have included the selection, implementation and use of technology (Mehrotra 1997; Green 1996; Matheson 1993); payment and performance systems (Fernie & Metcalf, 1999); unionism and employee relations (Korczynski, 1999; Taylor & Bain, 1999a; Taylor & Bain1999b); econometrics and workforce measurement (Betts, Meadows & Walley, 2000); sales and channel management (Daly, Wright, 1994; Anton, 2000); stress (Sczensiny, Stahlberg & Dagmar, 2000; de Ruyter, 2001); customer expectation and satisfaction measurement (Feinberg, Kim, Hokama, de Ruyter, Keen; 2000, Burgers, de Ruyter, Keen & Streukens, 2000; Bennington, Cummane & Conn, 2000) and work design (Frenkel, et al,1998, 1999), yet there have been no substantial or dedicated studies of call centre leadership.

Substitutes for Leadership- The Substitutes for Leadership theory was developed by Kerr & Jermier (1978) in an attempt to explain the successes and failures of previous

theories of leadership (Fleishman, 1953; Katz & Kahn 1952; House 1971; House & Dessler 1974; House & Mitchell, 1974; Pfeffer & Salancik 1975; Shcriesheim, 1985; Avolio & Bass, 1990). The substitutes for leadership model diverges from previous theories by suggesting there are other variables, at individual, task and organisational levels that act as substitutes for leadership (Kerr, 1977; Kerr & Jermier, 1978). Thus in searching for a causal relationship between leadership and outcomes, the fact that various leadership functions can be provided by means other than through a supervisor must be considered. Kerr & Jermier criticised prior models in that they assumed hierarchical leadership (the traditional human leader) was always important.

The Substitutes for leadership theory argues that there are substitutes, neutralisers or enhancers for leadership. Substitutes render leader behaviour unnecessary or redundant and are defined as "… a person or thing acting or used in place of another that renders relationship and/or task-oriented leadership not only impossible but also unnecessary" (Kerr & Jermier, 1978). A substitute is something in the environment that reduces the leader's ability to influence subordinate attitudes, perceptions or behaviours and essentially replaces the impact of the leader behaviour (Podsakoff, Niehoff, MacKenzie & Williams, 1993). A neutraliser prevents the leader from behaving in a certain way, they are moderator variables which "…. paralyse, destroy or counteract the effectiveness of something else. These are characteristics that make it effectively impossible for the leader to make a difference." (Kerr & Jermier,1978) and create an "influence vacuum" (Podsakoff, 1993). Neutralisers represent a negative moderating influence, meaning the stronger the neutraliser the weaker the predictor-criterion relationship (Howell, Dorfman & Kerr, 1986). In addition, Howell, Dorfman and Kerr (1986) note that some characteristics of the subordinate, task or organisation

may enhance the relationship between leader behaviour and subordinate criterion variables. Enhancers represent a positive moderating influence, meaning the stronger the enhancer the stronger the predictor-criterion relationship.

Substitutes, neutralisers or enhancers include any characteristics of the organisation, the task or the subordinate that assist the staff member understand their role, know how to do the job, be motivated and satisfied. For example, when a subordinate already possesses the knowledge or skills to perform a task, minimal direction is required. In repetitive tasks the subordinate can learn the skills, requiring minimal assistance or direction from the leader. If an organisation has written policies and guidelines then once these are learned, there is little direction needed from the leader. If the rules and procedures are very inflexible, the leader may be prevented from making a change to benefit the subordinate (Podsakoff et al, 1993).

The Substitutes for leadership theory is superior to other leadership theories (eg. Path-Goal, Transformational) for testing in the call centre environment for the following reasons. First, the theory explains why there are some situations where leader behaviour has significant effects on subordinate behaviours and attitudes whilst in others it does not. Second, the theory is more comprehensive than the Path-Goal theory (House, 1971; House & Baetz, 1979; House & Dessler, 1974; House & Mitchell, 1974) in identifying variables that may influence the relationship between leader behaviour and subordinate behaviour and attitudes (Podsakoff et al, 1993). Third, the model includes subordinate, task and macro-organisational variables in its framework. Fourth, Kerr (1977) and Howell (1986) suggest that the theory provides a model under which it might be actually desirable to build substitutes into the

organisation (eg. when there is a managerial succession problem) (Podsakoff, et al,1993).

There have been numerous studies undertaken to test this theory (Jermier & Berkes, 1979; Podsakoff, MacKenzie, Moorman & Fetter,1990; Podsakoff, MacKenzie and Bommer,1996; Sheridan, Vredenburgh, Abelson,1984; Podsakoff, Niehoff, MacKenzie and Williams,1993; Howell & Dorfman,1986). The results have been equivocal with evidence to support the theory and evidence to refute it. There are limitations of the research performed to-date including the lack of analysis of interaction effects, the small number of organisations involved in studies and the lack of investigation of new potential substitutes for leadership. This study attempts to overcome some of these limitations by introducing a new contemporary Technology as a Substitute for Leadership model.

Model and Hypotheses

The Technology as a Substitute for Leadership model predicts that the technology variables will moderate (substitute, neutralise or enhance) the relationship between leader behaviour and subordinate criterion variables. The team level performance criterion including customer satisfaction, customer complaints, productivity, ASA (average speed of answer), abandon rate, stress and tenure were included only in the descriptive stage of the analysis and not in the model, represented by Model 1, which tested for the moderating effects of the technology variables, at the subordinate level of analysis.

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The following hypotheses were explored in this study.

H1: Contingent on the key strategic priority of a call centre (productivity, customer satisfaction or employee satisfaction focused) leadership will be sourced from different configurations of human leadership and technology providing leadership.

H2: In call centres, technology variables will moderate the relationship between the leader behaviours and the subordinate criteria.

Research Design and Method

The study is exploratory research. The method chosen to collect data was cross-sectional using three self-completion survey instruments. Data was obtained from 45 call centres in Australia and New Zealand (66% response rate). From these call centres, 45 managers, 93 team leaders and 553 employees participated. The call centre manager completed a survey which rated the performance of the teams involved in the study and the technology used in their centre. The team leaders completed a survey assessing the performance of each front-line employee who reported to them and who was participating in the study. The front-line employees reported their perceptions of

their team leader's behaviours, the ways in which technology affected their work, as well as their own motivation, satisfaction, intention to turnover and stress levels. The dependent, independent and control variables in this study were operationalised using the following methods and instruments.

Dependent Variables- Employee's general satisfaction was measured using the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, Lofquist, 1967). The internal reliability has been reported as .92 (Gillet & Schwab, 1975). Employee's organisational commitment was measured using the Organisational Commitment Questionnaire (Porter and Smith, 1970). The internal reliability estimates have been reported as ranging from .82 to .93 (Mowday, Porter, Steers, 1979). Employee's in-role performance was measured using the In-role Performance Questionnaire (Podsakoff, Todor & Skov 1982). Internal reliability estimates have been reported as reaching or exceeding .90 (Farh, et al, 1987, Podsakoff et al 1982,1984,1986). Employee's extra-role performance was measured using the Organisational Citizenship Behaviours Reduced Scale (Bateman & Organ, 1983). Prior studies show this scale possesses good validity and very acceptable levels of internal consistency reliabilities (MacKenzie, Podsakoff & Fetter, 1991, Podsakoff & MacKenzie, 1994b, Podsakoff, Mackenzie, Moorman & Fetter, 1990). Employee's intention to turnover was measured using the Intention to Turn Over Questionnaire (Cammann, Fichman, Jenkins and Klesh, 1979). The internal reliability has been reported as .83 (Cammann, Fichman, Jenkins and Klesh, 1979). Employee's role ambiguity and role conflict were measured using the Role Ambiguity & Role Conflict scale developed by Rizzo, House and Lirtzman (1970). The internal reliability for role ambiguity has been reported as exceeding .80 and .70 for role conflict (Schuler, Aldag & Brief, 1977). Individuals

reported their level of stress on a scale of 1-3, 1 being low stress and 3 being high stress. Customer satisfaction levels, productivity (calls/seat/day), customer complaints, abandon rates and average speed of answer (ASA) were reported by the call centre manager for each team.

Independent Variables- Initiating structure and Supportive leadership were measured using a scale from the Leadership Behaviour Description Questionnaire (LBDQ) (Stogdill 1963). Internal reliabilities have been reported as .80 and .90 for Supportive leader behaviour and Initiating structure leader behaviour respectively (Schriesheim, Kinniki and Schriesheim, 1979). The reward and punishment leader behaviours were measured using the Reward and Punishment Leader Behaviour questionnaire (Podsakoff & Dorfman 1986). Internal reliability estimates for this scale have been reported as exceeding .80 (Podsakoff et al 1982, 1984). The technology as substitutes for leadership variables were conceptualised after preliminary interviews with call centre staff as to what leader behaviours they thought technology could provide. Call centre staff believed the technology could perhaps replace leader behaviours such as task and reward and punishment leadership. They did not think that technology could replace relations or supportive leadership nor transformational type leader behaviours. Technology providing task, reward and punishment behaviours were developed into scales using the exact questions asked in the leader behaviour scales (initiating structure, contingent and non-contingent reward and punishment) and modifying them to be interpreted as technology providing the behaviour.

Analysis

The analysis is exploratory, assessing the effect of the technology variables on leader behaviour and substitute criterion. It has been conducted in two stages. The first stage, which used the full data set (n=553), is a descriptive analysis at the team level. It provides a high level assessment of the mean levels of hierarchical and technological leadership. ANOVAs were conducted to determine significant differences in leadership sources between call centres which had high productivity, customer or employee satisfaction. The second stage of analysis, which used a subset of the data (to control for work-type), Routine work (n=357), involved data reduction, using an exploratory factor analysis, and then applied moderated multiple regression (MMR) to examine the moderating effects of the technology variables on the leader behaviours and criterion variables.

Results and Discussion

Stage One Results – Descriptives: Prior to the examination of associations between leader behaviours, technology and criterion variables, a phase of data description was necessary. The means, minimum, maximum values, standard deviations and correlations were calculated and reliabilities estimated. The results are set out in table 2.

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The *Task leadership* scale measures the degree to which the technology schedules and monitors work, provides feedback, imposes procedures and lets agents know what is expected of them. This scale had a Cronbach alpha coefficient of .84. About 73% of agents reported that the computer systems in their call centre occasionally to always provided them with task leadership. About 27% reported that it seldom or never did. In particular the computer systems often, *monitored agents' performance with respect to time spent on calls* and *imposed the same procedures on agents*. Technology providing task leadership has a positive correlation with the stress level of the manager and with team productivity (calls/seat/day). This means that in the call centres that had a high level of technology providing task leadership managers seemed to be more stressed, but the team was more efficient.

The *Contingent reward* scale measured the degree to which the agent perceives the technology rewards them when they have performed well. This scale had a Cronbach alpha coefficient of .81. About 26% of agents reported that the computer systems in their call centre often or occasionally provided them with contingent reward leadership. About 34% reported that the technology seldom rewarded them contingently and about 41% reported that it never did. The most frequent contingent reward behaviours displayed by the computer systems were, *gives me feedback when I perform well; will acknowledge me when I perform well in my job* and *lets my supervisor know when I do outstanding work.* Technology providing contingent reward leader behaviour has a positive correlation with team employee turnover. Interestingly, this suggests that the more the technology was used to reward agents the higher the turnover.

The *Contingent punishment* scale measured the degree to which the agent perceives or feels that the technology punishes them when they have not performed well. This scale had a Cronbach alpha coefficient of .86. About 9 % of agents reported that the computer systems in their call centre always or often provided them with contingent punishment. About 44% reported that the technology occasionally or seldom provided contingent punishment leadership. The most frequent contingent punishment behaviours displayed by the computer systems were, *lets me know when I perform poorly* and *indicates to me when my work is not up to standard.* Technology providing contingent punishment leader behaviour has a negative correlation with agent commitment, satisfaction and performance and a positive correlation with team level stress. This means that agents who feel they are punished by the technology may be more stressed and perform more poorly.

The *Non-contingent reward* scale measures the degree to which the agent perceives or feels that the technology rewards them indiscriminately. This scale had a Cronbach alpha coefficient of .73. About 2 % of agents reported that the computer systems in their call centre always or often provided them with non-contingent rewards. About 33% reported that the technology occasionally or seldom provided non-contingent reward leadership and about 65% reported that it never did. The most frequent non-contingent reward behaviour displayed by the computer systems was, *is just as likely to give me positive feedback when I do poorly as when I do well*. Technology providing non-contingent reward leader behaviour has a positive correlation with team level agent stress.

The *Non-contingent punishment* scale measures the degree to which the agent perceives or feels that the technology punishes them when they have or have not performed well. This scale had a Cronbach alpha coefficient of .85. About 2% of agents reported that the computer systems in their call centre always or often provided them with non-contingent punishment. About 32% reported that the technology occasionally or seldom substituted for non-contingent punishment and about 66% reported that it never did. The most frequent non-contingent punishment behaviours attributed to the computer systems were, *holds me accountable for things I have no control over* and *seems to frequently give negative feedback to me without me knowing why*. Technology providing non-contingent punishment leader behaviour has a negative correlation with team level organisational commitment, satisfaction and in-role performance (effectiveness) and extra-role performance (corporate citizenship) and a positive correlation with agent stress and turnover.

High Performance Call Centres: The data set was partitioned into those centres which had high and low productivity, high and low customer satisfaction and high and low employee satisfaction. Then tests (ANOVAs) were performed to ascertain areas of significant difference between the high and low groups, respectively. An interpretation of the results follows:

Productivity focused call centres: Leader Behaviours- In the high productivity call centre, it appears that an emphasis on acquiring skilled leaders who have a balance in their leadership style of both task (results focussed) and relations (supportive) focus is important. In these centres where the technology provides a higher degree of the task leadership, a slightly higher relations focused leader is also evident. Additionally

these leaders “punish” (providing negative feedback and corrective action) in a discriminate way. Indiscriminate or non-contingent reward and punishment leadership is not effective in high productivity call centres and may erode performance. *Technology*-To achieve a high productivity call centre it is also important that technology plays an increasing role in leading agents. Technology in these centres is of a high generation, either 3, 4 or 5 and is focused on providing task and contingent punishment leadership. *Performance* - The high productivity call centre achieved high levels of customer satisfaction and moderate agent satisfaction. It appears that the technology drives productivity by being task focused and allows the team leaders to provide relations and reward leadership support. The team leader’s job has some of the more basic functions taken over by the technology therefore making it a more tenable role, increasing their length of tenure. Areas of poorer performance include, the stress levels of agents and team leaders, possibly because of the dominance of task focus in the environment and the comparatively higher level of customer complaints, (which may be a comparative result of the higher level of calls received).

High Customer Satisfaction Call Centres: Leader Behaviours- The high customer satisfaction call centre has strong relations leadership, with an additional emphasis on reward. High levels of contingent and non-contingent punishment and non-contingent reward behaviour may not be effective in these centres. (Comparatively, low customer satisfaction call centres had higher levels of task, contingent and non-contingent punishment and non-contingent reward leadership). *Technology*- The technology is of a intermediate to high generation, levels 2 or 3. Technology also focuses on providing task and contingent and non-contingent reward for agents. This means that the agents are still driven towards efficiency, which is important in achieving customer

satisfaction, but at the same time they are strongly rewarded for their efforts. With the technology providing the task aspect of leadership, the leader can focus on providing relations support. *Performance*- The high customer satisfaction call centre has an additional focus on relations support and rewarding agents, compared to the productivity call centre. This leader behaviour will drive agents to provide better service whilst the technology will drive them on task (productivity) and punish discriminately. Such call centres appear to provide efficient service and high customer satisfaction, employee satisfaction, a longer team leader length of tenure and good agent in-role and extra-role performance. Areas of poorer performance may include a higher abandon rate.

High Employee Satisfaction Centres: Leader Behaviours - The high employee satisfaction centres showed higher levels of task, relations contingent and non-contingent reward and contingent punishment leader behaviour compared to productivity or customer focused centres. Non-contingent punishment leader behaviour is strongest in the low employee satisfaction call centre teams, as it was in the low productivity and low customer satisfaction teams as well. *Technology*- The high employee satisfaction centres had a lower level of technology generation (generation 2) than the low employee satisfaction model which may suggest that technology is linked to a degree of employee dissatisfaction. The high employee satisfaction centres also had a lower level of technology providing the leader behaviours than the low employee satisfaction centres. *Performance* -The distinguishing feature of the high employee satisfaction call centre is that the level of technology providing leadership is lower than the productivity and customer satisfaction call centres. Furthermore, the strongest human leader behaviours were

evident in these centres. Compared to the low employee satisfaction centres, the high employee satisfaction centres, achieved better results in stress levels of agents and team leaders, agent performance and employee satisfaction. However they did also have higher levels of manager stress, Average speed of answer, customer complaints, employee turnover and lower customer satisfaction. This may indicate the implicit tension in call centre teams where attempting to maximise employee satisfaction by doing things such as minimising technology providing leadership, results in poorer performance in other areas. There also does not appear to be a direct causal relationship between agent satisfaction turnover suggesting that there may be other influences in the environment apart from satisfaction that will determine turnover.

These results support the first hypothesis. Call centres which have higher performance, at the team level, in productivity, customer satisfaction or employee satisfaction, have different configurations of leadership. The following model summarises the contribution of leader behaviour and technology to leadership and the respective call centre type.

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Results thus far suggest that technology facilitates a higher task focus and higher productivity. It also facilitates relatively high levels of customer satisfaction (because speed and efficiency in call centres means higher customer satisfaction) but may contribute to agents being less satisfied. This may be because the task focus of the

technology combined with task leadership by the team leader creates a strong results focus in the centre, leading to stress and/or dissatisfaction.

Stage Two Results: The first step in this stage of analysis was to perform an exploratory factor analysis. This resulted in leader behaviour factors which were labelled, Supportive, Assigns Work and Makes Decisions. The reward and punishment behaviours loaded to existing scales. The technology variables resulted in factors which have been labelled, Positive Feedback on good performance, Negative feedback, Standards and Procedures, Feedback on poor performance and Monitors Work. The Satisfaction scale resulted in three factors, satisfaction with Autonomy, Supervision and Work Conditions. Extra-role performance resulted in three factors, Altruism, Conscientiousness and Attendance. All other scales factored to their existing scales. Next the moderating effects of the technology variables on the leadership variables and the subordinate criterion measures were assessed using the following technique. Leader behaviours were regressed on the subordinate criterion in the absence of the technology variables. Those leader behaviours which had a significant result were forced to remain in the regression equation and the individual technology variables were added. Then the technology x leader behaviour interaction effect was added and the significant △R-squared result noted. For the significant △R-squared results a split group analysis was performed regressing the leader behaviour on high and low levels of the technology variable.

Classifications of the moderating effects of the technology variables were made according to the following definitions (Howell & Dorfman, 1986). To be classified as a substitute for leadership the moderator must weaken the relationship between the

leader behaviour and the criterion. The leader behaviour must have significant main effect. The interaction term must be significant and have a different sign to the leader behaviour main effect. The substitute must have a significant main effect on the criterion in same direction as the leader behaviour main effect. To be classified as a neutraliser of leadership the moderator must weaken the relationship between the leader behaviour and the criterion but it is not necessary for it to have a significant main effect. The leader behaviour must have significant main effect. The interaction term must be significant and of a different sign to the leader behaviour. To be classified as an enhancer of leadership the moderator will strengthen the leader behaviour effect, although does not need to have a main effect itself. The leader behaviour must have significant main effect. Both the leader behaviour and the interaction term must be significant and have the same sign. Although not discussed in this paper Sharma, Durand & Gur-Arie (1981) and Childers, et al (1990) raise the importance of quasi and pure moderating effects. A variable may be classified as a *Quasi moderator* if both the interaction term and the moderator main effect are significant. A variable may be classified as a *Pure Moderator* if only the interaction term is significant.

Of the 35 moderating effects (20% of all possible effects), there were 14 enhancer (five negative and nine positive), four neutralisers, and three substitute effects. The remaining 14 interaction effects did not fit the above definitions (but according to Sharma et al, 1981 and Childers et al, 1990, may be classified as pure moderators and quasi moderators). The substitute, neutraliser and enhancer effects are detailed below (Standardised Beta Coefficients are reported in parentheses). The results are set out in table 3.

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Moderating Supportive Leader Behaviour: Monitoring Work *enhanced* (.10) the relationship between Supportive leader behaviour and Organisational Commitment. Feedback on Poor Performance *neutralised* (.12) the relationship between Supportive leader behaviour and Role ambiguity.

Moderating Assigns Work Leader Behaviour: Positive feedback (.18) *enhances*, and Feedback on poor performance (-.13) acts as a *substitute*, in the relationship between Assigns Work leader behaviour and Satisfaction with Work Conditions. Standards *neutralises* (-.13) and Monitors *enhances* (.17) the relationship between Assigns Work leader behaviour and Role conflict.

Moderating Decision-Making Leader Behaviour: Negative feedback (.15) and Standards (.14) *enhance* the relationship between Decision Making leader behaviour and Satisfaction with Supervision. Positive feedback *enhances* (.19) the relationship between Decision Making leader behaviour and Satisfaction with Work conditions. Feedback on poor performance *enhances* (-.14) the relationship between Decision Making leader behaviour and In-role performance.

Moderating Contingent Reward Leader Behaviour: Positive feedback *enhances* (.18) and Feedback on Poor performance *substitutes* (-.15) the relationship between

Contingent reward leader behaviour and Satisfaction with Work conditions. Standards is a *substitute* (-.15) for the relationship between Contingent reward leader behaviour and Role conflict. Monitors is an *enhancer* (-.16) of the relationship between Contingent reward leader behaviour and Intention to turnover.

Moderating Contingent Punishment Leader Behaviour: Feedback on poor performance is an *enhancer* (-.13) of the relationship between Contingent punishment leader behaviour and In-role performance.

Moderating Non-Contingent Reward Leader Behaviour: There were no moderators of Non-contingent reward leader behaviour and criterion variables.

Moderating Non-Contingent Punishment Leader Behaviour: Negative feedback is an *enhancer* (-.11) of the relationship between Non-contingent punishment leader behaviour and Satisfaction with Supervision. Positive feedback is a *neutraliser* (.14) of the relationship between Non-contingent punishment leader behaviour and Organisational commitment. Monitors Work is an *enhancer* (-.15) of the relationship between Non-contingent punishment leader behaviour and In-role performance and the relationship (-.13) between Non-contingent punishment leader behaviour and Conscientiousness. Standards is an *enhancer* (.12) and Feedback on poor performance is a *neutraliser* (-.14) of the relationship between Non-contingent punishment leader behaviour and Role ambiguity.

These results support the second hypothesis. The technology moderates each of the seven leader behaviours, in particular Non-contingent punishment, Supportive,

Assigns work and Contingent reward. Non-contingent reward is least effected by the technology variables. The criterion influenced by the most number of moderating effects is firstly, Work conditions and Altruism. This is followed in order of decreasing number of effects by Supervision and Organisational commitment, then In-role performance, Role Ambiguity and Role conflict, then Autonomy and lastly, Intention to turnover, Conscientiousness and Attendance. Technology providing Positive feedback has largely favourable effects, in particular on Autonomy and Organisational commitment. Technology providing Negative feedback has mainly unfavourable effects, in particular it decreases satisfaction with Supervision, Work conditions, Organisational commitment and Conscientiousness and it increases Role ambiguity and Conflict as well as Intention to turnover. In contrast to Negative feedback, Standards and Procedures has a largely positive influence on satisfaction with Work conditions, Organisational commitment and Conscientiousness and it decreases Role ambiguity, Conflict and Intention to turnover. Feedback on poor performance has a negative effect on In-role performance and Role ambiguity and Monitoring will improve Organisational commitment and reduce Role ambiguity. The strongest influence the technology variables have on the leader behaviours is to enhance them. Of the total number of significant interaction effects between leader behaviours and technology, 67% were enhancers, 19% were neutralisers and 14% were substitutes. The remainder were pure or quasi moderators.

Conclusion

Based on the results of the two stages of analysis, certainly it is difficult for call centre management to optimise productivity, customer and agent satisfaction,

simultaneously. However, this study has revealed that there are certain actions that can be taken to move towards this goal. Technology can be used to direct the task, to encourage the agents to be productive and to give them performance feedback. Customer satisfaction may also be facilitated through advanced technology. This releases the team leader to provide emotional support and motivation to the agents so that they will work efficiently and be satisfied in their role. However, the effect of the technology and its interaction with leader behaviour must also be considered. In particular Supportive leader behaviours and the Non-contingent punishment behaviours are influenced by the technology variables. If the call centre has leaders who punish indiscriminately, the negative effect of this behaviour can be exacerbated by the technology. However, where leaders display supportive or rewarding behaviour, the technology providing monitoring or positive feedback may increase the leader's positive influence on the subordinate.

When considering the leadership of call centres it is important to note that as technology becomes more advanced it will provide an increasing level of leadership to subordinates and may replace or restrict some leader behaviours. The implication of this is that management can configure sources of leadership in order to optimise performance of specific criterion. In doing so, they must be aware that leadership may be sourced other than from the hierarchical leader. Substitutes for leadership, such as technology, are evident in the call centre workplace and have an important and measured effect.

Table 1: Call Centre Generations of Technology

Generation 1 -	Incorporates the use of advanced switching capabilities including ACD (automatic call distributor) only.
Generation 2 -	Incorporates the use of advanced switching capabilities including ACD (automatic call distributor) and MIS (management information systems).
Generation 3 -	Incorporates the use of advanced switching capabilities including ACD, MIS, IVR (interactive voice response) and customer contact management desktop software.
Generation 4 -	Incorporates the use of advanced switching capabilities including ACD, MIS, IVR, CTI (computer-telephony integration) and advanced customer contact management desktop software.
Generation 5 -	Incorporates Multimedia, advanced switching capabilities including Internet voice and data integration to the desktop, ACD, MIS, IVR, CTI and advanced customer contact management desktop software.

Source: Hallis, 2000

Model 1: Technology as a Substitute for Leadership Model

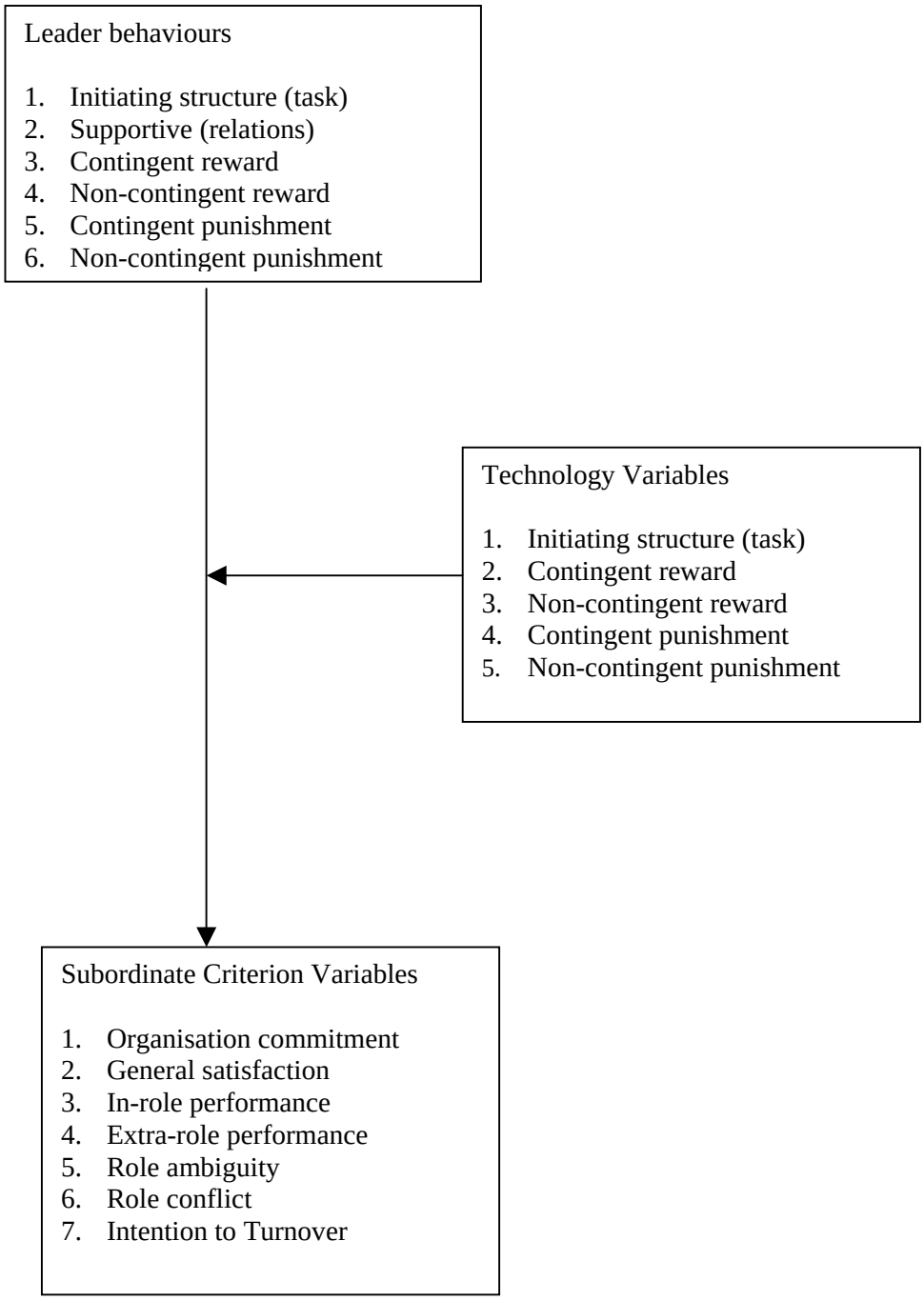

Table 2: Descriptive Statistics and Reliabilities

	N	Min	Max	Mean	Std Dvn	Reliability
Task Leader behaviour	515	21	50	40.38	5.87	.85
Relations Leader behaviour	524	12	50	40.55	6.63	.89
Contingent Reward Leader behaviour	502	10	50	37.24	8.70	.92
Contingent Punishment Leader behaviour	519	5	25	15.91	4.39	.78
Non-contingent Reward Leader behaviour	527	4	20	5.35	2.31	.58
Non-contingent Punishment Leader behaviour	523	4	20	7.61	2.85	.83
Technology-Task	513	9	45	28.13	8.41	.84
Technology - Contingent Reward	498	9	41	17.62	7.43	.81
Technology - Contingent Punishment	496	5	24	10.01	5.05	.86
Technology - Non-contingent Reward	499	4	18	6.08	2.92	.73
Technology - Non-contingent Punishment	495	3	15	4.54	2.25	.85
General satisfaction	515	37	100	74.51	11.70	.91
Organisational commitment	517	21	105	73.02	15.57	.88
In-role performance	482	4	28	21.20	4.92	.91
Extra-role performance	482	34	99	73.00	10.69	.90
Intention to turnover	518	3	21	10.50	5.81	.88
Role ambiguity	524	6	36	13.47	5.34	.81
Role conflict	517	10	56	38.32	9.75	.84
Stress level	405	1	4	1.90	0.76	-
Team Customer satisfaction	93			87%		
Team Customer complaints	93			3.6%		
Team Agent turnover	93			16.4%		
Team Agent tenure	93			1-2 years		
Team Productivity	93			55.8 calls/ seat/ day		
Team Average Speed of Answer	93			29.8 secs		
Team Abandon rate	93			4.9%		

Figure 1: Team leader/Technology Leadership Model

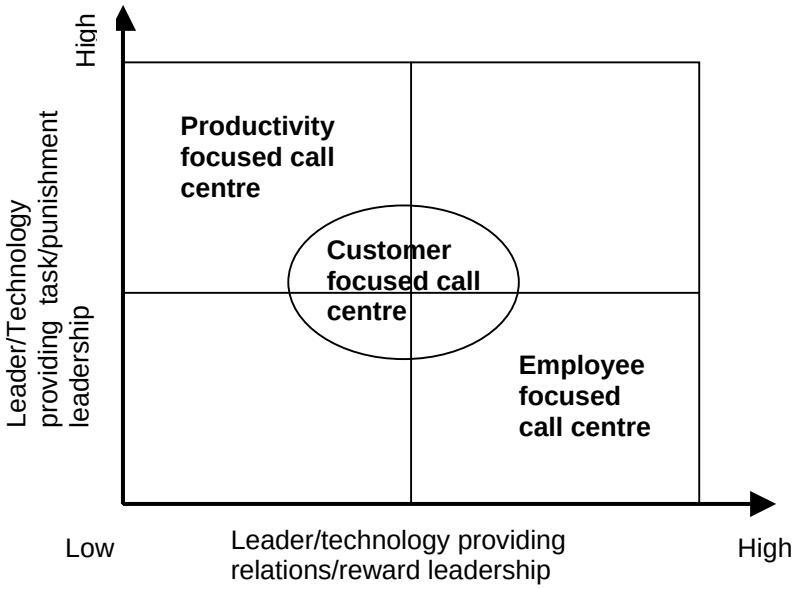

Table 3. Summary of Moderated Regression Analyses: Significant Leader Behaviours and Technology interactions

	Auto-nomy	Super vis.	Wk Cond	Org Com	In-role	Altru-ism	Con sci	Attend-ance	Int Turn-over	Role Amb	Role Conf
Supportive x											
• Feedback Good Perf.						-.15 PM					
• Negative Feedback						.13 PM					
• Feedback Poor Perf.										.12 Neut	
• Monitoring			.21 PM	.10 En		.12 PM					
AssignsWork x											
• Feedback Good Perf.			.18 En								
• Negative Feedback	-.14 QM			-.13 QM							
• Assigns Work/proc											-.13 Neut
• Feedback Poor Perf.			-.13 Sub								
• Monitoring											.17 En

	Auto-nomy	Super vis.	Wk Cond	Org Com	In-role	Altru-ism	Con sci	Attend-ance	Int Turn-over	Role Amb	Role Conf
Decision Making x											
• Feedback Good Perf.			.19 En								
• Negative Feedback		.15 En									
• Assigns Work/proc		.14 En									
• Feedback Poor Perf.					-.14 En						
Contingent Reward x											
• Feedback Good Perf.			.18 En								
• Assigns Work/proc						.11 QM		-.13 PM			-.15 Sub
• Feedback Poor Perf.			-.15Sub								
• Monitoring									-.16 En		

	Auto-nomy	Super vis.	Wk Cond	Org Com	In-role	Altru-ism	Con sci	Attend-ance	Int Turn-over	Role Amb	Role Conf
Contingent Punishment x											
• Feedback Good Perf.		.12 PM									
• Negative Feedback	-.14 PM			-.14 PM							
• Assigns Work/proc				.11 QM							
• Feedback Poor Perf.					-.13 En						
Non- Cont. Punishment x											
• Feedback Good Perf.				.14 Neut							
• Negative Feedback		-.11 En									
• Assigns Work/proc										.12 En	
• Feedback Poor Performance						-.17 PM				-.14 Neut	
• Monitoring					-.15 En	-.12 PM	-.13 En				

Sub = Substitute; Neut = Neutraliser; En = Enhancer; PM = Pure moderator; QM = Quasi moderator

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