

**Computer Technology, Leadership
and Subordinate Intention to Turnover in Call Centres.**

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Abstract

Given the high levels of front-line staff attrition in call centres (Deery and Walsh, 2001) it is of interest to understand what aspects of the workplace, which are within the control of management, influence subordinate turnover. In addition to antecedents such as pay and career (Belt, 2001; Crone, Carey and Dowling, 2001), previous studies have linked leadership and management styles to turnover (Jones, Katak, Futrell and Johnston, 1996). As many of the management functions in call centres are now provided through the computing system (Batt, 2000), an argument can be made that another possible contributor to turnover in call centres could be the invasive use of computer technology. This study sets out to test the contribution that the 'computer system providing leadership' makes to levels of subordinate turnover intentions in call centres.

Results from 357 subordinates in 45 call centres in Australia and New Zealand suggest that some of the ways that technology is used to provide leadership influence subordinate Intention to Turnover. In the particular case when technology was used to monitor subordinate performance it moderated the relationship between Contingent Reward leader behaviour and subordinate Intention to Turnover. Both theoretical and managerial implications of the study's results are discussed.

Background

Subordinate Intention to Turnover in Call Centres

Call centres are an international growth industry. In countries such as Australia the rate of growth in the number of seats (work stations where agents handle calls) in the call centre industry is about 20% per annum (ACA Research, 2002). Call centres may be defined as,

“Those workplaces which involve substantial customer contact and in which the majority of all interactions (between customers, employees and management) are mediated by electronic means.”

In these centres one of the most pressing issues facing management is the high rates of employee turnover. A recent industry study of call centres in Australia reported full-time staff turnover (resignations) as being 26% per annum and part-time staff turnover as 40% per annum (Hallis, 2003). These figures, on average, constitute an increase of 5% from the previous year. Academic studies of call centres in various countries have also reported similarly high levels of turnover (Brannan, 2001; Carroll, Cooke, Grugulis, Rubery and Earnshaw, 2001; van den Broek, 2001). With a cost of about \$15,000 to replace a single call centre agent, identifying causes of employee turnover in these centres has become a priority (ACA Research, 2004).

Various studies have attempted to identify attributes of the call centre environment that contribute to high levels of employee turnover. In the main, the literature has focused on issues of pay and career (Belt, 2001; Crone, Carey, et al, 2001; Korczynski, 2001; Stanworth, 2000; Taylor and Bain, 1999a) and satisfaction and commitment (Deery and Walsh, 2001; Frenkel, Korczynski, Shire and Tam, 1999; Houlihan, 2001; Ulrich, Halbrook, Meder, Stuchlik, and Thorpe, 1991) as antecedents to subordinate intention to turnover, which in itself has been found to be a reliable predictor of actual turnover (Griffeth, Hom and Gaertner, 2000).

The lack of career path available to agents is one of the most frequently cited causes of employee turnover in call centres (Belt, 2001; Korczynski, 2001). Belt, amongst others (Stanworth, 2000; Taylor and Bain, 1999) argue that call centres are relatively 'careerless', with employers accused of providing large numbers of low-skilled, repetitive, 'dead-end' jobs. Pay rates have also been associated with turnover rates. Crone, et al (2001) report a significant negative relationship between employees' pay rates and turnover. Other studies report high levels of turnover being associated with levels of employee stress and dissatisfaction (Houlihan, 2001) and the absence of managerial strategies designed to achieve high commitment from staff (Frenkel, et al, 1999). Not surprisingly, employee organisational commitment has also been correlated with subordinate intention to turnover. Deery and Walsh (2001) found that employees in an outsourced call centre who had low levels of commitment also had high levels of intention to turnover.

Although not specifically studied in a call centre, a further antecedent to subordinate intention to turnover, reported in a study of sales people by Jones et al., (1996), is leadership. Their study found that a manager's behaviour is associated with a subordinate's propensity to leave an organisation and to actual turnover. Similarly, Brown and Peterson's (1993) meta-analysis of a salesperson's antecedents and consequences of satisfaction also identified a link between leader behaviour and intention to turnover.

These studies have gone some way towards identifying key issues related to a subordinates' intention to turnover. However, one aspect of the call centre workplace which has not been studied, in relation to its effect on turnover, is computer technology providing leadership to employees. It is reasonable to suggest that computer technology, due to its prevalence in call centres, should be of particular importance when considering a subordinate's intention to turnover.

Computer Technology and Call Centres

For the purpose of this study computer technology is defined as *computer hardware, software and any output or artefact produced by the computer system in the workplaces being studied.*

Computer technology has become a critical component of workplace management in call centres. It can be used to provide task guidance, where the informing

(Zuboff, 1984) properties of information technology generate performance data reporting on conformity to procedures (Frenkel, Korczynski and Shire, 1998), policies and standards (Wharton, 1996), give positive and negative feedback to subordinates (Wallace, 2004), and monitor and assess the quality of the interaction between the service provider and the customer (Deery, 2002).

In essence, the technology performs several key functions that directly affect the worker. Call centre computer functionality can include the allocation and scheduling of work, monitoring of performance, providing feedback on targets achieved, highlighting errors, provision of product, service and customer information, CRM (customer relationship management), highlighting training needs and on-line training (ACA Research, 2002). The technology also provides front-line employees and management with immediate feedback on call centre KPIs (Key Performance Indicators). These indicators include the employee's availability to take calls (hours per day available to answer calls, typically 80 per cent), 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) (Wallace and Hetherington, 2003).

A further management practice in call centres, that utilises computer technology, is the undertaking of high levels of call monitoring (Holman, 2002) either by or through the computer. Call monitoring is predominantly used for discipline and

development (Frenkel, et al, 1999). However, it has also been reported as being used as a punishment device (Holman, 2002).

The effect of call monitoring on employees is a subject of controversy. Research by Holman (2002) suggests that in a call centre, greater control over work methods and procedures, a low level of monitoring and supportive supervision are associated with significant positive effects on agent well-being. In instances where call monitoring is used to punish agents, Holman reports a considerable negative effect on well-being. The study concludes that excessive monitoring may produce the opposite effect to that intended, that is, employees are depressed and less active. Other researchers report a more favourable effect of monitoring on employees. A case study of a call centre in the UK found that call centre monitoring was a positive aspect of the workplace, generally accepted by subordinates (Lankshear, Cook, Mason, Coates and Button, 2001).

As many call centre workers interact with technology up to or over eighty percent of their day (Batt, 2000) and there is limited contact with the supervisor, it would be reasonable to suggest that the technology may act as more than a controlling mechanism, that it may provide leadership to the subordinate. This leadership is not likely to include the more strategic functions of transformational leadership, but perhaps does provide functions similar to Stogdill's (1963) or Yukl's (1994) leadership categories which include managing and controlling, planning, clarifying, informing, monitoring and motivating the worker to higher levels of performance.

As such it is reasonable to suggest computer technology in call centres can be a substitute for hierarchical leadership.

Substitutes for leadership were defined by Kerr and Jermier (1978) as any aspect of organisational context that renders “relationship and/or task-oriented leadership not only impossible but unnecessary”, contributing itself to the explanation of the variance of the criterion variable. A substitute can be a characteristic of the subordinates, the task, the group or the organisation itself. Thus, a set of clear Standard Operating Procedures for a routine task can provide enough clarity about what needs to be done that no room is left for a hierarchical leader to “maintain definite standards of performance”. For this particular aspect of leadership, a hierarchical leader is irrelevant except to ensure that subordinates know and adhere to the Standard Operating Procedures.

To be classified as a *Substitute* for leadership a variable must moderate the effect of the leader behaviour in a way that weakens the relationship between the leader behaviour and the criterion. The leader behaviour must have a significant main effect and the moderator must also have a significant main effect in same direction as the leader behaviour. The interaction term must be significant and have a different sign to the leader behaviour main effect.

There are three advantages in using computer technology as a leadership substitute. First, a computer can be programmed to provide specific functions. By

standardising the provision of a leadership function, the variability in response generated by the personal interaction between a leader and an individual should be reduced. Second, management has complete control over whether to use computer technology as a leadership substitute as opposed to substitutes that depend on the individual. Finally, using computer technology to provide task guidance and feedback allows the role of the team leader to be changed. When some of the routine supervisory functions are transferred to the computer system, the need for human intervention at the frontline will be less (Applegate, 1994; Boddy and Buchanan, 1986; Howell, 1997). The excess management resources created in this way can then be redeployed in one of two ways: to achieve efficiencies in management or to provide more leadership to the front line. The time made available by using computer technology as a substitute for leadership can allow leaders to attend to other tasks or to expand spans of control without affecting performance (Howell, Bowen, Dorfman, Kerr and Podsakoff, 1990). Alternatively, the excess management resources generated can be used to increase the time spent facilitating team processes and developing individuals (Woodward, 1980).

Propositions

It is expected that call centre subordinates receive task or initiating structure (assigns tasks, schedules work, sets standards and enables production) leadership (Stogdill, 1963) from the computer technology. This occurs when the computer allocates and schedules work and gives guidance on standards and procedures.

As there is a negative association between subordinate intention to turnover and increased role clarity through task guidance provided by the leader (Johnston and Futrell, 1989), when the technology provides direct and immediate task guidance it is predicted to reduce the subordinate's intention to leave the call centre. As such the following propositions are generated.

Proposition 1: In call centres, computer technology that provides initiating structure (task) leadership will be negatively associated with subordinate intention to turnover.

Proposition 2: In call centres, computer technology that provides initiating structure (task) leadership will substitute for initiating structure (task) leader behaviour in influencing subordinate intention to turnover.

As a leader's rewarding behaviour has a negative effect on subordinate turnover (Kohli, 1985), it is also expected that computer technology which provides reward leadership through giving timely and direct positive feedback to the subordinate will reduce the level of subordinates' intention to turnover. The leader behaviour and the technology may also interact when influencing turnover intentions. Having two separate sources of reward should reduce the subordinates' intention to turnover even further. As such the following propositions are generated.

Proposition 3: In call centres, computer technology that provides reward (contingent or non-contingent) leadership will be negatively associated with subordinate intention to turnover.

Proposition 4: In call centres, computer technology that provides reward (contingent or non-contingent) leadership will positively moderate reward (contingent or non-contingent) leader behaviour in influencing subordinate intention to turnover.

Leader punishment behaviours have been negatively associated with subordinate satisfaction (Podsakoff, MacKenzie and Bommer, 1996b) and in turn subordinate satisfaction has been reported to be negatively associated with intention to turnover (MacKenzie, Podsakoff and Ahearne, 1998). It is therefore expected that technology providing punishment leadership will be positively associated with subordinates' intention to turnover. That is, the higher the degree of punishment behaviour by the technology, the more likely the subordinate is to say that they will leave the centre. Furthermore, as punishment may be an unpleasant duty for a manager, one would expect that they would use the computer to replace their activities. As such the following propositions are generated.

Proposition 5: In call centres, computer technology that provides punishment (contingent or non-contingent) leadership will be positively associated with subordinate intention to turnover.

Proposition 6: In call centres, computer technology that provides punishment (contingent or non-contingent) leadership will substitute for punishment (contingent or non-contingent) leader behaviour in influencing subordinate intention to turnover.

Some studies suggest unfavourable effects of performance monitoring on subordinates. Aeillo and Kolb (1995) reported that in a laboratory study closely controlled and monitored participants were more stressed than non-monitored participants and stress has been positively associated with turnover (Dubinsky, Dougherty and Wunder, 1990). In the call centre environment however, where it is thought that monitoring is commonly used as a development tool rather than as a control or punishment device (Frenkel, et al, 1999), it is expected that technology which monitors subordinate performance will make a significant negative contribution to subordinates' intention to turnover. This prediction is consistent with findings by other call centre researchers who have suggested that monitoring functions, when not imposed in a controlling capacity, have largely favourable effects on employees (Frenkel, et al, 1995; Lankshear, et al, 2001). As with punishment, one would expect that management would use the technology to replace its monitoring activities wherever possible.

Proposition 7: In call centres, computer technology that monitors performance will be negatively associated with subordinate intention to turnover.

Proposition 8: In call centres, computer technology that monitors performance will moderate, or substitute for feedback (reward or punishment) leader behaviour in influencing subordinate intention to turnover.

Method

Sample

In response to preliminary enquiries, 68 call centre managers in Australia and New Zealand agreed to take part in the study. Questionnaires were posted to call centre managers for distribution to their front-line teams to complete. Results were obtained from 45 call centres, providing responses from 357 front-line agents. As the study uses aggregated data from call centres about the influence on subordinates when the computer system is used to provide standard leadership functions, the self-selection bias of the participating call centres should not be of concern.

The call centres taking part in the study were predominately in metropolitan areas (93%) and represented a wide range of industries: government (25%), business services (23%), finance (21%), retail (11%) and telecommunications (9%). As well as varying by industry and size, there was variation in the sophistication of the computer systems used in the call centres. All centres had the capability to automatically distribute calls. However they differed in their capacity to capture

data, to use interactive voice response and to integrate the computing and telephone systems.

Measures

The dependent variable measured was the subordinate's Intention to Turnover. This variable was measured using the Intention to Turnover Questionnaire (Cammann, Fichman, Jenkins & Klesh, 1979). Items included, 1) How likely is it that you will actively look for a new job in the next year? 2) I often think about quitting, and 3) I will probably look for a new job in the next year. The employee responded using the scales from: 1 (Not at all likely) to 7 (Extremely likely) for item 1. Items 2 and 3 used scales from 1 (Strongly disagree) to 7 (Strongly agree). The internal reliability of this scale has been reported as .83 (Cammann, et al, 1979).

In order to assess the degree to which a variable substitutes for leadership it is necessary to measure the leader behaviour it is predicted to replace. Typically, the leader behaviour scales used in the Substitutes for Leadership studies are the LBDQ Form XII (Stogdill, 1963) scales for Initiating Structure (task) and Consideration (relations) behaviour and the Reward and Punishment (contingent and non-contingent) behaviours scales used by Podsakoff, et al, (1982) and (1984). Internal reliabilities for these scales have ranged from 0.80 to 0.93 (Podsakoff, et al, 1982).

The items used to measure the contribution of the computer system to the leadership of the front-line staff were based on the hierarchical leadership scales (Podsakoff, Todor and Skov, 1982; Stogdill, 1963). Items in the leadership scales were rephrased in terms of the computer system providing the leadership function if this was at all possible; if this was not possible, the item was not used. Thus, for example, the items from the Initiating Structure scale such as, “how frequently does your team leader schedule the work to be done?” can be used, *mutato mutandis*, to apply to the computer system by asking, “how frequently does the computer system schedule the work to be done?” On the other hand, the item from the same scale, “how frequently does your team leader try out his or her ideas on the team?” does not seem appropriate to ask of a computer system and so was omitted. Two items relating to the computer system monitoring the subordinates were added. These items assessed agents’ performance with respect to time spent on calls and agents’ performance with respect to quality of calls. (See Appendix for full scale).

The items used to assess the contribution of the computer system to leadership were factor analysed, using principal components with varimax rotation resulting in uncorrelated factors (Tabachnick and Fidell, 2001). Five distinct factors with eigenvalues greater than one were found and labelled, 1) Technology Assigns Work and Standards (Initiating Structure), 2) Technology Monitors Performance, 3) Technology Rewards, 4) Technology Punishes Contingently and 5) Technology Punishes Non-contingently.

Data description

Descriptive statistics for the independent and dependent variables were calculated and are presented in Table 1 below. The means, standard deviations and reliabilities of the leadership behaviour variables were all within the ranges reported in the literature. The reliabilities of the technology variables were all equal to or greater than .7, indicating that the variables had acceptable internal consistency (Cronbach, 1951) and therefore could be used in further analysis.

Table 1: Means, Standard Deviations and Reliabilities of Factors (N=357)

Variables	Mean	No. of Items	Std Dev	Rel
Technology Variables				
Technology Rewards	15.29	9	7.70	.93
Technology Punishes Non-contingently	7.60	5	3.66	.88
Technology Assigns Work and Standards	18.78	6	6.02	.82
Technology Punishes Contingently	10.80	5	5.70	.89
Technology Monitors Performance	9.77	3	3.54	.70
Leader Behaviours				
Supportive Leader Behaviour	32.99	8	5.53	.89
Leader Sets Standards	21.01	5	3.24	.79
Leader Makes Decisions	19.57	5	2.88	.73
Contingent Reward Leader Behaviour	37.10	10	8.60	.92
Non- contingent Punishment Leader Behaviour	7.38	5	2.95	.73
Contingent Punishment Leader Behaviour	15.98	5	4.36	.77
Non-contingent Reward Leader Behaviour	5.54	3	2.23	.79
Intention to Turnover	10.42	3	5.71	.88

The correlations between the variables were calculated and are shown in Table 2.

Significant negative correlations existed between Intention to Turnover and

Technology Assigns Work and Standards and Contingent Reward leader behaviour.

Significant positive correlations with Intention to Turnover were found for

Technology Punishes Contingently and Non-contingent Punishment leader behaviour.

Table 2: Intercorrelations of Technology Variables, Leader Behaviours, and Criterion Variable (N=357)

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1.Technology-Rewards	1.0											
2. Technology – Punishes Non-Contingently	.00	1.0										
3.Technology-Assigns Work & Standards	.00	.00	1.0									
4. Technology – Punishes Contingently	.00	.00	.00	1.0								
5. Technology - Monitors Performance	.00	.00	.00	.00	1.0							
6.Leader behaviour-Sets Standards & Procedures	-.07	-.10	.16**	.09	.05	1.0						
7.Leader behaviour-Makes Decisions	.16**	-.04	.05	.04	.07	.00	1.0					
8.Leader behaviour-Contingent Reward	.09	-.15**	.01	.03	.12**	.29**	.20**	1.0				
9.Leader behaviour – Non-Contingent Punishment	.10	.32**	-.18**	-.01	.04	-.14**	.09	.00	1.0			
10.Leader behaviour – Continent Punishment	.10	-.05	.11	.15**	-.05	.27**	.21**	.00	.00	1.0		
11. Leader	.21**	.01	.06	-.04	.01	.01	.18**	.00	.00	.00	1.0	

Behaviour- Non-contingent Reward													
12. Intention to Turnover	-.09	-.02	-.12**	.15**	-.03	-.04	-.09	-.20**	.20**	.04	-.04	1.0	

** significant at $p < .01$

Analysis and Results

The Substitutes for Leadership analysis tests for potential moderators of leadership which will replace or effect the leader behaviour effect (Podsakoff, et al, 1982). As such it is necessary to first assess those leader behaviours which have a significant main effect on the criterion, in this case, subordinate Intention to Turnover. Hence, the initial stage of analysis involved regressing the criterion variable, Intention to Turnover, on the individual leader behaviours in order to assess their contribution to variance, in the absence of the technology variables. A similar procedure was then undertaken to assess the contribution of the technology variables to the criterion, in the absence of the leader behaviours. These results are set out in tables 3 and 4.

Table 3: Individual Leader Behaviour Contribution to Variance of Intention to Turnover (R-squared)

		Supportive	Assigns Work	Decision Making	Contingent reward	Contingent punishment	Non-Contingent reward	Non-Contingent punishment
Intention to Turnover	R2	.058	.002	.008	.039	.001	.002	.039
	Sig.	.000*	.453	.105	.000*	.512	.422	.000*
	Beta	-.241	-.041	-.089	-.197	.036	-.044	.197

* significant at p< .050

Table 4: Individual Technology Variable Contribution to Variance Intention to Turnover (R-squared)

		Technology Rewards	Technology Punishes Contingently	Technology Assigns Work/ procedures	Technology Punishes Non-Contingently	Technology Monitors performance
Intention to Turnover	R2	.008	.023	.015	.000	.001
	Sig.	.101	.007*	.028*	.778	.644
	Beta	-.091	.150	-.122	-.016	-.026

* significant at p< .050

Those leader behaviours that had a significant main effect on the Intention to Turnover variable were selected to be included in the moderated multiple regression stage of the analysis (Podsakoff, MacKenzie and Fetter, 1993a). Each significant individual leader behaviour was fitted to an equation and then the individual technology variables were added one at a time followed by an interaction term (leader behaviour x technology). A comparison was made (change in R-squared) between the leader behaviour plus technology equation and the equation containing the interaction term.

There was evidence for only one significant moderation effect. Technology Monitors Performance acted to positively moderate (that is enhance (Howell, 1986)) the relationship between Contingent Reward leader behaviour and the criterion, Intention to Turnover. To be classified as an *Enhancer* of leadership the moderator strengthens the leader behaviour effect, although it does not need to have a main effect itself. The leader behaviour must have a significant main effect and both the leader behaviour and the interaction term must be significant and have the same sign. There was no evidence of any substitution effects.

Discussion

Providing support for Proposition 1, Technology Assigns Work/Standards (Initiating Structure) had a significant negative main effect on subordinate Intention to Turnover. This result suggests that technology which assigns work and provides

guidance on standards and procedures is associated with a reduction in the subordinate's intention to turnover. These results are supportive of Podsakoff, et al (1996b) who reported that task leader variables are strongly related to subordinate affect. It also supports Hackman and Oldham (1980) and Scott's (1966) findings that task variables are a key predictor of subordinate outcomes. Technology Assigns Work/Standards did not act to moderate or substitute for any leader behaviours. Consequently, Proposition 1 is supported however there is no evidence to support Proposition 2.

There was no evidence to support Propositions 3 and 4, which predicted that Technology Rewards would have an effect on subordinate Intention to Turnover and enhance the corresponding leader behaviour.

Consistent with expectations, Technology Punishes Contingently had a significant positive main effect on subordinate Intention to Turnover. This result suggests that the negative feedback provided by the technology to the subordinate is associated with an increase in the subordinate's intention to turnover. However, Technology Punishes Contingently did not act to moderate or substitute for leader behaviour. These results support previous studies (Podsakoff and MacKenzie, 1994; Podsakoff, et al, 1986) which found that although often contributing directly to outcomes, situational variables usually did not substitute for the leader's punishment behaviour. Consequently, there is evidence to support Proposition 5, but no evidence to support Proposition 6.

Technology Monitors Performance did not have a significant effect on Intention to Turnover as expected. There was no evidence to support Proposition 7. This variable did however act to moderate the relationship between the leader's Contingent Reward behaviour and the Intention to Turnover criterion. Interestingly, the technology variable did not act as a substitute, that is, it did not replace the leader behaviour effect. Instead it was an enhancer of the leader behaviour (Howell, et al, 1986). The leader's Contingent Reward behaviour had a negative association with Subordinate Intention to Turnover. This suggests that the favourable effect on the subordinate from the leader's reward behaviour, a reduction in their intention to turnover, is enhanced in the presence of the technology monitoring the subordinate's performance. This result supports findings by other researchers who have suggested that monitoring functions have largely favourable effects on employees (Frenkel, et al, 1998; Lankshear et al, 2001). While, there is no evidence to support Proposition 8, which predicted that the technology would substitute for the corresponding leader behaviour, there was a significant moderation effect.

Based on a review of the literature, it was expected that technology would play a significant role in influencing subordinate intention to turnover, substituting for the leader behaviours. In fact, for only one of the four propositions tested was there any evidence of moderation and in that case there was evidence of enhancement rather than substitution.

There are several reasons that may explain why there was no evidence of substitution. Despite the successful piloting of the survey questionnaire, there may have been some conceptual problems for respondents when answering the technology related questions. Respondents were asked to rate the degree to which they believed the technology provided task leadership and rewarded and punished them. These questions may have been more difficult for people to respond to than the leader behaviour items. Also, there may be some response bias when the respondents are asked whether computer technology provides leadership to them. Some people may be willing to acknowledge that they receive leadership from a human but not from a machine. There may also be measurement issues. The numbers of significant moderators in the study may have been reduced due to the reduction in power of the tests resulting from multiplication of variables containing measurement error (Busemeyer and Jones, 1983). Also, the search for moderating effects may have been influenced by the study's use of Likert type scales to measure dependent responses. This can cause information losses and reduce the chance of detecting interaction effects (Russell and Bobko, 1992).

The result that the computer technology acted to enhance leader behaviour rather than substitute for leadership does however support Dawson's (1987a) suggestions that it is not so much a matter of replacing supervisors with technology, but rather redesigning composite front-line supervisory tasks around a mixture of traditional practices and new computer-oriented activities. Simply stated, the technology acts

to reinforce the particular leader behaviour rather than replace it (House and Baetz, 1979).

Another explanation for the lack of substitution effects may be that subordinate Intention to Turnover is more dependent on leader behaviour than on the computer system. As noted in the conclusion to a study by Dionne, Yammarino and Atwater (2002) (pg. 461),

“ The substantive importance of these results centre around the statement, *leadership matters*. ...These key findings reflect traditional, less complicated leadership theories and serve to remind that simple ideas regarding leader-follower relations remain important.”

Overall, this study's results support assertions by Podsakoff, et al, (1996) that when investigating subordinate affect or attitudinal criteria such as Intention to Turnover, leadership moderators (such as computer technology) can be expected to have significant effects but largely do not replace the role of the leader.

Implications for research and management

One implication of this study for research is that as the technology variables developed demonstrated good psychometric properties, in many cases superior to the classical substitutes for leadership, they could be sensibly used in future studies.

Further research needs to be undertaken to address the technical weaknesses of this study, mentioned above, and to test the generalisability of the results to sites other than call centres. Certainly the results of this study show that researchers who are interested in the antecedents of subordinate turnover should not neglect the role of computer technology, especially when studying high usage computer environments such as call centres. Furthermore, any future investigations of employee turnover should consider at the same time the leader behaviours and technology functionalities and the possibility that they might interact.

Also, while this study found some evidence of a relationship between technology, leadership and subordinate turnover intentions, it is highly likely that this relationship is mediated by other variables such as subordinate satisfaction and commitment (MacKenzie, et al, 1998) and role perceptions such as role clarity and role ambiguity (Johnston and Futrell, 1989). Future research should include these potential mediators.

For managers, one assumption challenged by the results reported here is the belief that non-personal control, especially when delivered through invasive computer technology, is always deleterious to employee affect and hence turnover intentions. It may well be that there are situations where this would be the case: professionals are much less likely to accept formalised control systems (Howell and Dorfman,

1986). However, in the current study of call centres, there was evidence of a positive response to at least some of the aspects of the managerial role of computer technology. The results of this study show that using the technology to provide non-contingent negative feedback does have a negative effect on subordinates' turnover intentions. On the other hand, using the technology to assign work and standards was seen as positive by the employees.

Managers face a considerable challenge in configuring leadership sources with the knowledge that both the hierarchical leader and the computer technology may affect subordinate turnover intentions directly and sometimes interact. The results of this study provide some guidelines for what management functions the computer technology can be used to provide and which ones should be avoided.

Conclusion

From this study we conclude two things. First, it is clear that certain aspects of the management role of computer technology are associated with subordinate intention to turnover. Interestingly, some functionalities of the technology are positively related to subordinate intention to turnover whilst other functionalities are negatively related. The use of computer technology as a management tool may also interact with leader behaviours to enhance the leader-subordinate relationship. This has implications for the design of call centre technology and for management practices.

Second, although the effects of the technology did not supersede the influence of the hierarchical leader, the technological characteristics of the workplace should be included in both the study of leadership and of subordinate turnover intentions in high technology usage workplaces such as call centres.

Appendix A: Agent Survey - Computer Technology Items

As technology advances and becomes more sophisticated it can sometimes replace activities that people usually do. In thinking about the technology or computer systems that you use in your job, please rate the following questions with regard to how often you think the computer systems perform the tasks mentioned, using the scale below.

Never	Seldom	Occasionally	Often	Always
1	2	3	4	5

The computer system(s) I use in my job

	Never	Seldom	Occasionally	Often	Always
1. Lets agents know what is expected of them	1	2	3	4	5
2. Imposes the same procedures on all agents	1	2	3	4	5
3. Makes it clear what work needs to be done and how it should be done	1	2	3	4	5
4. Assigns agents to particular tasks	1	2	3	4	5
5. Schedules the work to be done	1	2	3	4	5
6. Provides information to agents on their performance	1	2	3	4	5
7. Gives information to agents about standard rules and procedures	1	2	3	4	5
8. Monitors agents' performance with respect to time spent on calls	1	2	3	4	5
9. Monitors agents' performance with respect to quality of calls	1	2	3	4	5

Also, when people use computers a lot, it may seem like the technology punishes or rewards them, in a sense. With regard to the computer systems used in your call centre, please rate how often you feel the technology rewards or punishes you,

Never	Seldom	Occasionally	Often	Always
1	2	3	4	5

The computer systems(s).....

	Never	Seldom	Occasionally	Often	Always
1. Indicates if I perform at a level below that which I am capable of	1	2	3	4	5
2. Gives me positive feedback even when I don't deserve it	1	2	3	4	5

3. Lets me know when I perform poorly	1	2	3	4	5
4. Specially acknowledges me when my work performance is very good	1	2	3	4	5
5. Indicates to me when my work is not up to standard	1	2	3	4	5
6. Gives me positive feedback when I perform well	1	2	3	4	5
7. Acknowledges me when I do a better than average job	1	2	3	4	5
8. Acknowledges me when I do outstanding work	1	2	3	4	5
9. Gives me no feedback even when I perform well in my job	1	2	3	4	5
10. Feels like it almost punishes me if my work is below standard	1	2	3	4	5
11. Will reward me if I do well	1	2	3	4	5
12. Will not acknowledge me when I perform well in my job	1	2	3	4	5
13. Seems to give negative feedback to me without my knowing why	1	2	3	4	5
14. Quickly acknowledges an improvement in the quality of my work	1	2	3	4	5
15. Critiques my work for no apparent reason	1	2	3	4	5
16. Gives me negative feedback even when I perform well	1	2	3	4	5
17. Lets my supervisor know when I do outstanding work	1	2	3	4	5
18. Gives me positive feedback even when I perform poorly	1	2	3	4	5
19. Is just as likely to give me positive feedback when I do poorly as when I do well	1	2	3	4	5
20. Holds me accountable for things I have no control over	1	2	3	4	5
21. Will alert me when my work is below acceptable standards	1	2	3	4	5

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