
IJMMIR

International Journal of Management and Marketing Research

VOLUME 4

NUMBER 3

2011

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THE INFLUENCE OF EMPLOYEE AFFECT ON LEADER-MEMBER EXCHANGE AND PERCEPTIONS OF PSYCHOLOGICAL CONTRACT VIOLATION

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ABSTRACT

This research investigated employees' psychological dispositions of positive affect, negative affect, and cynicism as potential influences upon their perceptions of psychological contract fulfillment or violation. Leader-member exchange (LMX) was hypothesized to serve as a partial mediator of the relationship. Prior research has focused mainly on direct relationships between various personality variables and either LMX or psychological contract violation; none have yet examined LMX as a potential mediator. A model of these proposed relationships was developed based on theory drawn from the areas of social psychology, LMX, and psychological contracts. Survey data was gathered from 278 respondents across five organizations and structural equation modeling was used to examine the strength of the relationships in the proposed model. While positive affect and negative affect were found to significantly relate to both LMX and the perception of psychological contract violation, LMX was not found to function as a mediator of the relationship. Employee cynicism was not significantly related to LMX and only weakly related to perceptions of psychological contract violation.

JEL: M12; M54

KEYWORDS: psychological contract, leader-member exchange, personality

INTRODUCTION

Several studies within the last decade have delved into the relationship between individuals' personality characteristics and the formation of perceptions of psychological contract breach and violation (Raja, Johns, & Ntalianis, 2004; Zhao & Chen, 2008). Parallel to this interest in personality and psychological contracts; another stream of research has focused on the influence of subordinates' personality traits upon the formation of high quality Leader-Member Exchange (LMX) relationships (Harris, Harris, & Eplion, 2007). Surprisingly, even though subordinates' supervisors have been theorized to play a major role in the development of subordinates' psychological contracts (Rousseau, 1995), no research has yet investigated the relationship between individual personality factors of subordinates, LMX, and perceptions of psychological contract violations.

Rousseau (1995), building on the work of Argyris (1960), Levinson, Price, Munden, Mandl, and Solley (1962), and Schein (1965), defined the psychological contract as the mutual obligations that an employee perceives to exist between oneself and one's employer. Violation of the psychological contract occurs when the employee perceives that the organization has failed to fulfill the terms of the contract and he/she experiences feelings of disappointment and anger in response (Morrison & Robinson, 1997). This perceived violation has been associated with a number of negative outcomes for both the employee and the organization such as lower employee trust in the employer (Robinson, 1996), lower job satisfaction (Robinson & Rousseau, 1994), lower job performance (Turnley & Feldman, 2000), reduced organizational citizenship behaviors (Robinson & Wolfe Morrison, 1995; Turnley & Feldman, 2000), higher turnover (Robinson & Rousseau, 1994), and less loyalty to the organization (Turnley & Feldman, 1999).

The concept of LMX rests upon the premise that supervisors will develop relationships of varying quality with their subordinates and thus provide them with varying levels of support and rewards commensurate with such differential relationships. In this article, we examine the roles that selected personality factors play with regard to perceptions of psychological contract violation and the formation of high-quality LMX, as well as the role that LMX plays in mediating these perceptions. While, as DelCampo (2007) notes, this type of research may have important implications for employee selection, this is not exclusively our intent. Rather, we hope that this information may be a step in understanding the way that individual differences may be taken into account when creating systems and processes to increase organizational performance.

In the following sections, we first review the literature and develop hypotheses based on an integration of various theories into a single model. We then describe the sample, the methodology used, and the results of the tests. We conclude with a discussion of the results in the context of current research and we note the limitations of the study as well as suggest directions for future research.

LITERATURE REVIEW

Prior to outlining our model of psychological contract violation, we must first address the distinction between breach and violation of the psychological contract. “Perceived breach” is the cognitive component of the perception, while in order for “violation” to occur, one must also experience an affective component (Morrison & Robinson, 1997). While an individual may be cognitively aware that the organization has not fulfilled some of its promises, this does not always lead to the development of felt violation, which can be much more serious in its outcomes (Turnley & Feldman, 2000). Negative emotions are more likely to spur the individual to action versus merely possessing the knowledge that the organization somehow has not lived up to its promises (Robinson & Wolfe Morrison, 2000).

Two primary factors that can be identified as potential contributors to psychological contract violation are (a) the employee’s relationship with his or her supervisor, and (b) personality characteristics of the employee that exert an influence on that employee’s perceptions of events. Since managers are one of the primary contract makers for they not only are able to impact the terms of the contract, such as salary and job duties, they are also able to ameliorate the effects of negative organizational events through special favors, emotional support, or by offering a plausible explanation for the event (Rousseau, 1995).

LMX theory essentially states that supervisors treat their subordinates differently, with some receiving more favorable treatment than others (Liden, Sparrowe, & Wayne, 1997; Schriesheim, Castro, & Cogliser, 1999). High quality LMX has been linked to a number of positive outcomes for members, such as increased job satisfaction (Masterson, Lewis, Goldman, & Taylor, 2000); higher performance ratings and level of delegation (Scandura & Schriesheim, 1994; Schriesheim, Neider, & Scandura, 1998); salary progression, promotability, and career satisfaction (Wayne, Liden, Kraimer, & Graf, 1999); and supply of resources and support for innovative behavior (Scott & Bruce, 1994). Since high quality LMX is related to positive outcomes for employees, it can be expected that they will receive more of what was initially promised to them and therefore it can also be expected that they would be more inclined to perceive their psychological contract as having been fulfilled.

Employees may also perceive the same organizational event differently based on their propensity to interpret events in a negative or positive manner (Turnley & Feldman, 1999). There is a substantial body of research which indicates that individual differences in trait positive and negative affect influence the manner in which a person interprets and responds to events (Brief & Weiss, 2002; Diener, Nickerson, Lucas, & Sandvik, 2002; Grandey, Tam, & Brauburger, 2002) as well as interacts with other people (Baur & Green, 1996; Phillips & Bedeian, 1994). Cynicism emerges as another personality characteristic,

possibly related to affect, that may also be expected to influence an individual's perception of events as well as his or her social fluidity.

Influence of Affect on LMX Formation

In *The Social Psychology of Groups*, Thibaut and Kelley (1959) proposed that successful dyad formation occurs based upon a sampling of behavior by each party with respect to the other. In brief, we choose to continue to interact with individuals with whom we experience net rewards and disengage with those with whom we experience net costs. For example, reduction of a drive or fulfillment of a need can be considered a reward, while behaviors where mental or physical effort are required or unpleasant feelings are aroused such as anxiety or embarrassment would clearly be a cost. This usually occurs during our initial interactions with another person, and we are predisposed to attend more strongly to negative information during these encounters (Cacioppo & Gardner, 1999).

In the employee/supervisor relationship, either may make a rapid judgment of the other based upon their initial interactions. This relatively quick impression formation has been proposed as being one avenue through which high quality LMX develops (Dienesch & Liden, 1986), and has garnered a degree of empirical support (Dockery & Steiner, 1990; Liden, Wayne, & Stilwell, 1993). Along a similar line of reasoning, a number of studies have reported a positive relationship between "supervisor liking" (of the subordinate) and LMX quality (Dockery & Steiner, 1990; Murphy & Ensher, 1999; Wayne & Ferris, 1990). Unfortunately for the subordinate, the burden for positive interactions rests upon his or her shoulders and is a responsibility over which he or she may have a fairly low degree of control.

The model of affective social competence, (Halberstadt, Denham, & Dunsmore, 2001) depicts emotions as the "primary elements in social interactions" (p. 79), that is, the expression and recognition of emotion is a fundamental determinant of successful social interaction. The terms "trait positive affect" (PA) and "trait negative affect" (NA) refer to a propensity to experience corresponding positive and negative mood states and these traits have been found to be temporally stable and exhibit a degree of consistency across situations (Watson, 2000). Based on this line of thought, positive and negative trait affect emerge as strong candidates for influencing the outcomes of dyadic interaction, since emotions both contribute to, and are manifestations of underlying affect (Watson, 2000).

Indeed, PA and NA have been found to influence individuals' emotional reactions in the workplace (Grandey, Tam, & Brauburger, 2002). It would be expected that those high in either type of trait affect would be more prone to experiencing moods and emotions reflective of that particular trait. Consequently, they would exhibit a greater number of behaviors that would reflect the influence of the trait. It follows that this would influence the perceptions of the other person with whom the individual was interacting as to whether the interaction provided net rewards or net costs.

When observers viewed videotapes of individuals who had had a positive or negative mood induced and had been filmed surreptitiously, the observers were able to distinguish the PA individuals from the NA individuals (Forgas, 2002). Happy participants were judged to behave in a more poised, skilled, and rewarding manner, while participants in whom NA had been induced were judged as being significantly less friendly. NA has been linked to deterioration in relationship quality over time, while PA predicted improvements in relationship quality regardless of whether individuals remained in the same relationship or switched partners (Robins, Caspi, & Moffit, 2002).

Those high in PA are more likely to display positive emotions across situations (Tan, Foo, Chong, & Ng, 2003) and thus provide more rewards for those with whom they interact, i.e. their supervisors. Support for this assertion also comes from studies in which it was found that displays of positive emotions were associated with corresponding positive affect in those with whom subjects were interacting (Pugh, 2001;

Wampler, Shi, Nelson, & Kimball, 2003). Furthermore, it was found that dispositional PA predicted supervisory performance ratings over a four-year time period (Wright & Staw, 1999). Conversely, those high in NA have been found to be more prone to negative interpersonal interactions and comments (Robins, Caspi, & Moffitt, 2000; Watson & Clark, 1984), actions which would not be expected to facilitate the formation of high quality LMX.

Finally, direct evidence of the potential link between trait affect and LMX comes from two studies that examined the influence of negative affect on LMX. In the first study (Engle & Lord, 1997), researchers reported a negative relationship between NA and supervisor rated LMX. In the second study, NA was also negatively related to LMX, however, the subordinates rated LMX in that particular study (Hui & Law, 1999).

Cynicism and LMX

For the present study, we used the conceptualization of cynicism as that which is directed toward other people in general. This individual characteristic has been referred to as “trait” or “personality” cynicism (Dean Jr., Brandes, & Dharwadkar, 1998; Johnson & O’Leary-Kelly, 2003), a term indicative of the characteristic’s enduring nature. Cynicism, conceptualized in this manner, has been associated with negative expressions of facial affect (Brummett, Maynard, Babyak, Haney, Siegler, Helms, & Barefoot, 1998) and the possibility that cynical individuals are more inclined to engage in provocative encounters (Zwaal, Prkachin, Husted, & Stones, 2003).

There is evidence that the receiver of a facial expression will experience the sender’s affect by unconsciously mimicking the sender’s expression (Dimberg, Thunberg, & Elmehed, 2000). In the case of negative facial expressions, the resulting effect on the receiver would be to experience an unpleasant state. Likewise, engaging in a negative encounter with a subordinate would not generate rewards for the supervisor. Thus, it is expected that trait cynicism will be associated with lower levels of leader-member exchange.

Direct Influence of Affect and Cynicism upon Perceptions of Psychological Contract Violation

In addition to influencing an individual’s perception of psychological contract fulfillment or violation through his/her relationship with the supervisor, PA and NA may also have a direct influence on these perceptions. A number of studies have examined the relationship of dispositional variables to job attitudes (Brief & Weiss, 2002; Thoresen, Kaplan, Barsky, Warren, & de Chermont, 2003), yet none have investigated the role of affect in the prediction of psychological contract violation and only one study examined affect’s relationship to breach (Suazo, 2002). In the process model of psychological contract violation developed by Morrison and Robinson (1997), they propose that employees who exhibit a greater degree of vigilance in monitoring the environment for discrepancies between what was promised and what was delivered by the organization will be more likely to perceive contract breach than those employees who are not as vigilant in their monitoring. The evidence regarding affect and sensitivity to stimuli indicates that those high in NA tend to be much more sensitive to aversive stimuli than those high in PA, are more vigilant in anticipating problems, and view themselves and reality through a negative lens (Brief & Weiss, 2002; Larsen & Ketelaar, 1991; Rusting & Larsen, 1998).

Individuals high in personality cynicism are mistrustful of others and possess the attitude that others are mostly interested in self gain and will engage in dishonesty, manipulation, and conniving to achieve their ends (Abraham, 2000). Cynically hostile persons are also more likely to attribute intentionality to others’ negative behavior and believe that this is more representative of others’ behavior in general (Pope, Smith, & Rhodewalt, 1990). Thus it is possible that those high in personality cynicism would be more likely to

interpret negative events as having an intentional component and therefore be more likely to experience felt violation in response to such events.

Based on the preceding theoretical development, we generated the following hypotheses:

Hypothesis 1: LMX quality will be negatively related to employee perceptions of psychological contract violation.

Hypothesis 2a: Positive affect will be positively related to LMX quality.

Hypothesis 2b: Negative affect will be negatively related LMX quality.

Hypothesis 3: Cynicism will be negatively related to LMX quality.

Hypothesis 4a: Positive affect will be negatively related to perceived psychological contract violation.

Hypothesis 4b: Negative affect will be positively related to perceived psychological contract violation.

Hypothesis 5: Cynicism will be positively related to perceived violation.

LMX as a Mediator

While positive affect, negative affect, and cynicism are expected to exert an influence upon individuals' perceptions of organizational events, it is also plausible that the employee's relationship with the supervisor will serve to mediate these effects to some degree since many rewards that an employee receives are at the supervisor's discretion. Rousseau (1995) states explicitly: that "... managers play a special role in making or breaking the psychological contracts of their employees p. 64." She postulates that, through the development of high quality LMX, the manager will provide a greater degree of communication and support to the subordinate as well as be able to clarify the mutual expectations of the parties.

High quality LMX has been proposed to facilitate a greater degree of communication between an employee and his/her supervisor (Morrison & Robinson, 1997). This enhanced communication would serve to minimize any incongruence between what the employee believes was promised and what organizational agents, including the manager, believe was promised, and thus reduce the likelihood of perceived violation through the alignment of the employee's perceptions of organizational obligations with those of management. In addition to resolving differences in perception, enhanced communication may also function as a buffer between occurrences of organizational renegeing and the employee's perceptions and emotional reaction to such an event. Employees who receive credible explanations for such events are less likely to perceive psychological contract violation (Rousseau, 1995).

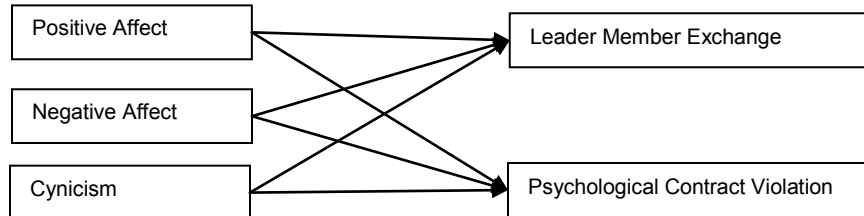
The relationship between employee and supervisor may itself function as a reward in that the supervisor is able to provide emotional support and nurturance to the employee. Levinson et al. (1962) believed that employees bring certain dependence needs with them and that supervisors are critical in satisfying these needs. Some employees may explicitly believe that the supervisor is obligated to furnish this type of support, especially if he/she has perceived that this state of affairs has been promised at some point in the relationship. Research has demonstrated that employees associate broken promises with lack of social as well as technical support, and they implicate the supervisor in 28 percent of all perceived broken promises (Conway & Briner, 2002).

These propositions are embodied in the following hypothesis:

Hypothesis 6: LMX will partially mediate the relationship between positive and negative affect, cynicism, and perceived violation.

A model of the hypothesized relationships is presented in Figure 1.

Figure 1: Model of Direct and Indirect Effects of PA, NA, and Cynicism on LMX and Psychological Contract Violation



This figure shows the hypothesized paths between the personality constructs and the outcomes of leader-member exchange and psychological contract violation in the proposed model. Positive affect (PA) is hypothesized as being positively related to Leader-member Exchange (LMX), and negatively related to psychological contract violation. Both negative affect (NA) and cynicism are hypothesized as being negatively related to LMX and positively related to psychological contract violation. LMX is hypothesized to partially mediate the relationship between PA, NA, cynicism and the perception of psychological contract violation.

DATA AND METHODOLOGY

Participants and Procedures

Survey data was collected from 278 subordinates and 72 supervisors in four service oriented private sector organizations and an office of the state government. The four service oriented organizations consisted of a fast food restaurant; a group of casual dining restaurants and their company administrative headquarters; the human resources department of a major hospital; and a branch of a family entertainment corporation. The number of participating subordinates per supervisor ranged from a low of 1 to a high of 10. The survey was voluntary for both subordinates and supervisors and out of the 278 subordinates who completed surveys, 231 also had supervisors who completed surveys.

In three of the organizations, three levels of employees and supervisors were surveyed. The middle levels completed both an employee survey and then rated each of their direct reports with the supervisor survey. In the other two organizations the bottom and top levels completed either an employee survey or supervisor surveys, but not both. Surveys were administered to both employees and their supervisors, with the supervisors completing surveys on each of their subordinates. The supervisors' surveys contained only the scale for LMX.

While each organization was encouraged to allow an on-site administration and collection of the surveys, this was not always possible. In three cases, at the administrative headquarters of the casual dining corporation, at the family entertainment establishment, and at the office of the state government, this did occur and we were able to administer surveys to both subordinates and their supervisors separately and then collect them. In the other organizations, the surveys were either mailed to the respondents with an accompanying recruitment letter, or were distributed to their workplace mailboxes by an organizational representative. To guarantee anonymity in these cases, a self-addressed stamped return envelope was provided to the respondent.

The response rates for these organizations were as follows: for the fast food restaurant it was 24% (23 out of 94 subordinates), for the casual dining restaurants it was 32% (31 out of 97 subordinates), for the administrative headquarters of the casual dining restaurant it was 91% (59 out of 65 subordinates), for the

office of state government it was 95% (57 out of 65 subordinates), for the family entertainment establishment it was 17% (78 out of 453 subordinates), and at the human resources department of the major hospital it was 33% (33 out of 100 subordinates).

Measures

All variables were measured using established scales. Trait positive and negative affect was measured with the Positive Affect Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen; 1988). The PANAS consists of two ten-item adjectival subscales; one for positive affect and the other for negative affect.

Trait cynicism was measured with Wrightsman's (1992) 10-item Cynicism Subscale. Items such as "People pretend to care more about one another than they really do," are included in the scale and the responses are made on a seven point Likert type format ranging from "strongly disagree," to "strongly agree." Higher scores indicate a greater degree of trait cynicism.

Leader-member exchange quality was measured with the 12-item LMX-MDM scale developed by Liden & Maslyn (1998). It measures four LMX dimensions - affect, loyalty, contribution, and professional respect - and can be summed to provide a global measure of LMX. The wording on the supervisor LMX scale was changed to reflect the supervisor's perspective with respect to the employee. For example, the item "My supervisor is the kind of person one would like to have as a friend," on the employee's survey would be altered to read "This employee is the kind of person one would like to have as a friend." The administration of this scale to the supervisor was intended to provide some degree of insurance against common method variance. However, correlations between the two sources of LMX ratings tend to vary across studies (Gerstner and Day, 1997), although repeated administrations of scales to the two populations tend to produce results that converge (Scandura, Graen, & Novak, 1986).

Psychological contract violation was measured using a 4-item scale developed by Robinson and Morrison (2000) consistent with their model in which they distinguished between felt violation and perceived breach (Morrison & Robinson, 1997).

Data on age, gender, organizational tenure, and dyadic tenure (with the present supervisor) were also collected in order to determine whether or not they may represent a possible confound. While these factors have been postulated to exert an influence on LMX and psychological contracts (Ng & Feldman, 2009), research findings have been inconclusive (Bocchino, Hartman, & Foley, 2003; Restubog, Bordia, Tang, & Krebs, 2009; Suazo, Turnley, & Mai-dalton, 2008).

Data Analysis

The data for the model were analyzed using structural equation modeling (SEM). SEM accommodates imperfect reliability in measures and it treats the relationships between variables as a unit instead of in a more piecemeal fashion (Kline & Klammer, 2001). It also models the relationships between unobserved, or "latent" variables, of which the observed variables are indicators. The two drawbacks of SEM are that it does require larger sample sizes than other techniques, and there may exist multiple models that fit the data equally well.

In accordance with the two-stage procedure outlined by Anderson and Gerbing (1988), a measurement model was evaluated to establish convergent and discriminant validity of the scales, and then the structural model's fit was evaluated. This two-stage sequence is designed to minimize *interpretational confounding*, which occurs in the case of observed variables loading on constructs other than what was

specified a priori. Failure to test the measurement model prior to the structural model may result in fluctuations in the pattern coefficients when alternate structural models are estimated.

RESULTS

Maximum likelihood estimation (ML) was used to produce parameter estimates. This technique has the advantage of being fairly robust to moderate departures in multivariate normality (Rigdon, 1994). A covariance matrix derived from item parcels, rather than single scale items, was used as input into the SEM program (LISREL). Item parcels have the advantage of being more continuous and less coarsely categorized than the single item indicators from the limited response choices of the Likert scales; they are less likely to lead to attenuated estimates of Pearson correlation coefficients.

In order to create the item parcels, scale items for positive affect, negative affect, and cynicism were combined randomly by summing pairs of items beginning with the first item and last item, and then following the same procedure with the remaining pairs of items. Randomly combining items to form composites has been shown to produce results comparable to other more complex methods (Landis, Beal, & Tesluk, 2000). The construction of the LMX parcels was theory driven and they were combined according to the dimension of LMX that they were theorized to represent: affect, loyalty, contribution, and professional respect (Liden & Maslyn, 1998). This resulted in four LMX parcels, each composed of the average of three items.

Descriptive Statistics

Means, standard deviations, and correlations for the summed composites of the variables appear in Table 1. An examination of these zero-order correlations provides preliminary support for the hypothesized relationships. Note that the correlations between the exogenous variable indicators, PA, NA, Cynicism, and the endogenous variables, LMX and psychological contract violation, are all significant and in the hypothesized direction.

Table 1: Score Ranges, Means, Standard Deviations, Correlations, and Reliabilities

Scale	Range	M	SD	1	2	3	4	5	6	7
1 PA	15 to 50	37.27	8.02	.91						
2 NA	10 to 38	16.23	6.02	-.35*	.84					
3 Cynicism	10 to 70	36.98	12.55	-.15*	.30*	.92				
4 LMX	13 to 87	65.00	13.90	.41*	-.41*	-.18*	.93			
5 Psychological Contract Violation	4 to 20	8.41	3.95	-.44*	.55*	.31*	-.37*	.89		
6 Age	16 to 73	35.07	13.80	.10	-.06	-.35*	.03	-.01		
7 Organization Tenure (yrs)	.08 to 31	6.19	6.90	-.12	.09	-.13	-.14	.21*	.57*	
8 Dyadic Tenure (yrs)	.08 to 15	2.09	2.78	-.09	.03	-.01	-.06	.25*	.34*	.55*

Rows 1 - 5 of this table contain the range of respondent scores for each instrument, the means of the scores, and the correlations between the scores collected from subordinate surveys. Rows 6 - 8 contain the ranges, means, and standard deviations for age and time related variables. * indicates significance at the 1 percent level. Scale reliability coefficients (α) are along the diagonal.

Time in the organization and time with the present supervisor were both significantly correlated with psychological contract violation. In order to investigate the possibility that these two time-related variables shared explanatory power with the other exogenous variables we correlated PA, NA, and Cynicism with LMX and psychological contract violation while controlling for time in organization and time with supervisor. The resulting correlations were virtually unchanged from the zero-order correlations with respect to both significance and magnitude. We therefore concluded that while this may

indicate that the longer one spends in the same organization, or with a particular supervisor, the more likely it is that one will perceive that promises have been broken, this effect is independent of the influence of affect or cynicism.

Independent samples *t*-tests revealed no significant difference between mean levels of LMX quality or psychological contract violation between males (N=100) and females (N=178).

Leader-Member Exchange Perspectives

As was noted under *measures*, LMX was measured from both the employees' perspective and the supervisors' perspective as a guard against common method bias. In past research, initial administrations of LMX instruments have often produced different ratings of supposedly the same construct (Gerstner & Day, 1997; Schriesheim et al., 1998). Mean subordinate ratings of the relationship tend to be lower with greater standard deviations than the ratings produced by the supervisors (Scandura, Graen, Novak, 1986). However, in studies where the instruments have been repeatedly administered, ratings from supervisors began to converge on those from the subordinates. Scandura et al. (1986) attributed this phenomenon to managers' initial apprehension regarding the perceived evaluation of their role performance and therefore they desire to appear "socially acceptable" and thus do not discriminate between lower and higher LMX.

The data from the current study bore out these previous findings. Descriptive statistics and correlations for the LMX variables are presented in Table 2. Employee rated LMX is correlated .43 with supervisor rated LMX (SLMX). These correlations are very similar to the higher end of the LMX/SLMX degree of agreement found in other studies (Maslyn & Uhl-Bien, 2001; Schriesheim et al., 1998).

Table 2: Score Ranges, Means, Standard Deviations, Correlations, and Reliabilities for Subordinate and Supervisor Ratings of LMX

	Scale	Range	M	SD	1	2
1	Subordinate Rated LMX	13 to 84	65.00	13.9	0.93	
2	Supervisor Rated LMX	37 to 84	67.23	12.05	.43*	0.94

*This table contains a comparison of the ranges, means, and standard deviations between subordinate-rated LMX and supervisor-rated LMX. The correlation coefficient appears in column 1, row 2. * indicates significance at the 1 percent level. Scale reliability coefficients (α) are on the diagonal.*

Due to the possibility that supervisors are not honestly answering the LMX items in this single administration of the instrument, the following analyses will be conducted with the employee rated LMX scores unless otherwise noted. An analysis of separate models incorporating the different measures appears in a later section of this article.

Evaluation of Measurement Model

A five factor measurement model indicated a fair fit for the data: $\chi^2 = 569.62$ ($df=284$, $p<0.01$), root mean square error of approximation (RMSEA) of 0.057, and a goodness of fit index (GFI) of 0.87. While the χ^2 statistic alone indicates a misspecification of the model, the other fit indices were close to the "standards" of RMSEA < .05 and GFI > .90. An examination of the path coefficients for the parcels on their factors indicated that fit could be improved by the deletion one parcel per factor. Therefore, parceled items consisting of items 1, 2, and 3 for the LMX measure; items 1 and 10 for the PA measure; items 5 and 6 for the NA measure; and items 4 and 7 for the cynicism measure were deleted from the model.

An inspection of the LISREL modification indices indicated that allowing some of the error terms among the items for the PA and NA subscales would also improve fit. While it is not recommended to allow measures to correlate in this way (Anderson and Gerbing, 1988), these are items within the same scale (PANAS), and thus some of them might be expected to have correlated error terms. Two of the NA parcels and one of the PA parcels exhibited the highest modification indices and thus were allowed to correlate through their error terms.

The new model exhibited a $\chi^2 = 240.93$ ($df=171$, $p=0.00034$), which was still less than the desired p level of 0.05, but the RMSEA improved to 0.035 and the GFI improved to 0.93. While the fit may have been improved to a greater degree by allowing more error terms to correlate this raises the potential for the model to become well fitted to the particular data set at the expense of generalizability. The fit of the model was acceptable with the modifications that had been made, and therefore we proceeded with the analysis.

The path coefficients for each scale item were at least twice its standard error and met the Anderson and Gerbing (1988) standard for convergent validity. Discriminant validity was established through a series of χ^2 difference tests. The difference between the χ^2 estimates for all tests of all pairs reached significance and the two factor models always produced the lower χ^2 value, thus providing evidence of discriminant validity for each of the measures.

Evaluation of Structural Model

In order to test the degree to which the hypothesized relationships between constructs are valid in the population, the fit indices for the hypothesized model were examined and then a series of “nested” models were compared through χ^2 difference tests. Interpretation of the fit indices provides an idea of how well the model fits the data in an absolute sense, while the comparison to other models provides an idea of how well the model fits in a relative sense (Anderson & Gerbing, 1988). If the difference in the χ^2 fit index is significant, then the less constrained model is favored over the more constrained model. In this study, the hypothesized model is fully saturated, and therefore it was compared with only models that are more constrained.

Standardized parameter estimates for this model and an alternate model that contains supervisor rated LMX are presented in table 4. The fit indices for this model are as follows: $\chi^2 = 156.79$ ($df=106$, $p=0.00099$), RMSEA = 0.042, and the goodness of fit index (GFI) = 0.94. In this case, although the χ^2 did reach significance, it is close in magnitude to the df , and the other fit indices are acceptable. When compared to the null model ($\chi^2 = 3532.17$, $df = 136$) and a model in which the paths from the exogenous variables to psychological contract violation have been constrained to zero ($\chi^2 = 255.45$, $df = 109$), the hypothesized model clearly has the better fit of the three.

Testing for Mediation

There was no support for H6 that LMX acts as a partial mediator of the relationship between positive and negative affect, cynicism, and perceived violation of the psychological contract. To test for this, the parameter estimates for two models were compared: one in which LMX was deleted and only paths between the exogenous variables and psychological contract violation were estimated, and one in which LMX was entered. There was no difference in parameter estimates for cynicism to psychological contract violation, indicating that LMX does not at all mediate the relationship between these two constructs. The paths from PA and NA to psychological contract violation did change, but only slightly. In both models, the parameter estimates were significant.

The standardized estimates for the effect of PA and NA on psychological contract violation were -0.31 and 0.43 respectively. Upon entering LMX into the model, these changed to -0.28 and 0.39 respectively. Standardized parameter estimates for the effects of PA and NA on LMX, were 0.28 for PA and -0.33 for NA and the standardized parameter estimate of LMX on psychological contract violation was -0.12 with a standard error of 0.06 and a t -value of -2.00. Under ML estimation with non-normally distributed variables, t -values may be inflated (Hau & Marsh, 2004). Because this particular t -value was quite close to the significance cutoff value of -1.96, we decided to test the parameter estimate against the hypothesis that it was no different from 0.

Another model was specified in which the path from LMX to psychological contract violation was fixed at 0. This model's χ^2 was compared to that of the hypothesized model. The χ^2 difference between the model with the parameter set to 0 and the alternate model was 2.93 with 1 df . This χ^2 value is not significant and, therefore, it was concluded that the parameter is not significantly different from 0.

Given the fact that the parameter estimates from LMX to psychological contract violation are no different from 0, which indicates lack of an indirect effect from PA, NA, and cynicism on psychological contract violation through LMX, there is no support for the hypothesis that LMX acts as a mediator of the relationship between positive and negative affect, cynicism, and perceived violation of the psychological contract.

Evaluation of Remaining Hypotheses

Hypotheses H2a, H2b, H3, H5, and H6 have to do with whether or not the exogenous variables will be related to the endogenous variables and whether the relationship will be positive or negative, while H1 has to do with the relationship between the endogenous variables. H1 specifies that LMX will be negatively related to psychological contract violation. The data do not support this hypothesis. The mediation tests demonstrated that the path from LMX to psychological contract violation could be constrained to 0 without significantly affecting model fit. This test indicates that H1 is not supported.

H2a, H2b, and H3 specify the nature of the relationship that the personality variables PA, NA, and cynicism were expected to have with LMX. Specifically PA was expected to exert a positive effect on LMX, while NA and cynicism were expected to exert negative effects. H2a and H2b were supported by the data while H3 was not. The parameter estimates for the effects of PA and NA on LMX, 0.28 and -0.33 (standardized) were both significant and had the hypothesized sign. The estimate for cynicism on LMX was small in magnitude (-0.01) and did not reach significance.

H4a, H4b, and H5 specify the nature of the relationship between PA, NA, and cynicism with psychological contract violation. The data supported both the existence of the relationship and whether the effect was positive or negative. All of the parameter estimates were significant and had the hypothesized sign. PA was negatively related to psychological contract violation (-0.28), NA was positively related to psychological contract violation (0.39), and cynicism was positively related to psychological contract violation (0.18). All estimates are standardized.

Comparison of Subordinate Rated LMX and Supervisor Rated LMX

The hypothesized model was specified once each with subordinate rated LMX, and then supervisor rated LMX. The two models were then compared. Because not all supervisors volunteered to be in the study, the N was smaller for supervisor rated LMX at 231 complete cases. The supervisor rated LMX model had a slightly better fit as demonstrated in Table 3.

An examination of the squared multiple correlations for the models' endogenous variables, LMX and psychological contract violation, revealed that the proportion of variance explained for supervisor rated LMX was substantively lower than for subordinate rated LMX: .10 versus .26.

Table 3: Comparison of LMX Models

Model	χ^2	df	p	RMSEA	GFI
Subordinate Rated LMX	156.79	106	0.00099	0.042	0.94
Supervisor Rated LMX	146.34	106	0.0058	0.038	0.93

Table 3 shows a comparison of fit indices between models containing LMX measured from the subordinates' perspectives and then supervisors' perspectives respectively. The χ^2 statistic tests the null hypothesis that the specified model fits exactly in the population. Smaller differences between χ^2 statistics and degrees of freedom indicate better fit of a model. P values greater than .05 are desirable. A root mean square error of approximation (RMSEA) of less than .05 is indicative of good approximate fit, as is a goodness of fit index (GFI) greater than 0.90. While p values are larger than desirable for these two models, when considered together, these indices signal an overall acceptable fit.

What is particularly interesting about these complementary models is that the greatest difference in parameter estimates for the paths between NA and the LMX variable and PA and the LMX variable, occurs in the model in which supervisor rated LMX is used. Possibly subordinate NA has a greater influence than subordinate PA on the way that a supervisor views the relationship. Standardized parameter estimates for these two models appear in Table 4.

Table 4: Parameter Estimates between Exogenous and Endogenous Variables

Model	PA to LMX	PA to Psychological Contract Violation	NA to LMX	NA to Psychological Contract Violation	Cynicism to LMX	Cynicism to Psychological Contract Violation
Subordinate rated LMX	0.28*	-0.28*	-0.33*	0.39*	-0.01	0.18*
Supervisor rated LMX	0.15	-0.27*	-0.22*	0.37*	-0.01	0.17*

Table 4 contains standardized parameter estimates for paths between the exogenous variables and the endogenous variables for the two structural models containing LMX as rated by subordinates versus LMX as rated by their supervisors. The magnitude of the absolute value of parameter estimates indicates the strength of the relationship between the two constructs as noted in the column heading. * indicates significance of $-1.96 < t < 1.96$ (the t-value is the ratio of the parameter estimate to its standard error).

DISCUSSION

The results of this study indicate that the affective components of employees' personality exert an influence on leader-member exchange (LMX) and psychological contract violation. Employees higher in PA did in fact tend to perceive their relationships with their supervisors as higher quality and they tended to have positive feelings regarding the degree to which the organization had fulfilled its promises to them. Employees higher in NA exhibited the opposite pattern of perceptions; they perceived their relationships with the supervisors to be of lower quality and they felt a greater degree of anger and dissatisfaction toward their organization regarding unfulfilled promises, indicating a higher degree of psychological contract violation. The hypothesis that LMX partially mediates the relationships between affect and psychological contract violation was not supported.

The finding that NA is negatively related to LMX replicates and extends previous findings (Engle and Lord, 1997; Hui, Law, & Chen, 1999). The present study differs from previous studies in that it is a field study and in that fact that LMX was measured from both the subordinates' and the supervisors' perspectives rather than only the subordinates' perspectives. While previous studies found that supervisors tend to like subordinates high in PA more than those low in PA (Dockery & Steiner, 1990), the results for the influence of PA on LMX in our study was less definitive. The finding that PA exerts a more modest effect on LMX is plausible in light of the fact that negative information is more salient to

humans than is positive information (Pratto & John, 1991). Opinions of others based on negative verbal and non-verbal behavior are formed rapidly and are resistant to change (DePaulo & Friedman, 1998; Gilbert, 1998) and it is likely that supervisors would form higher-quality relationships with those who exhibit either neutral or positive verbal and non-verbal behaviors.

The relationships of affect to perceptions of psychological contract violation tend to parallel the relationship of affect to LMX and are consistent with the broader prior research findings linking trait affect to attitudes (Judge, Heller, Mount, 2002; Thoresen et al., 2003). Raja et al. (2004), found neuroticism, a correlate of NA, to be positively related to perceived psychological contract breach, a correlate and precursor of violation. However, they found no significant relation between extraversion, a correlate of PA, and perceived breach. This difference may be partially due to differences in sample characteristics since their study was conducted in Pakistan among a narrower range of respondents in terms of organizational level of employees surveyed.

The hypothesized negative relationship between cynicism and LMX was not supported by the data. The hypothesized positive relationship between cynicism and psychological contract violation was supported, although the effect was comparatively small. Due to the fact that some measures of cynicism are contaminated by a NA bias (Hart & Hope, 2003), we performed a post-hoc analysis in which the effects of NA were partialled out of the correlations between cynicism and LMX, and between cynicism and psychological contract violation. The resulting correlation between cynicism and LMX then became insignificant. Therefore, it may be that the effects of cynicism on LMX relationships are mostly manifestations of NA.

While the relationship between cynicism and psychological contract violation remained significant after controlling for the effects of NA, the effect was lower in magnitude. Therefore, as the structural model indicates, cynicism does exert an effect on psychological contract violation independent of the effects of NA. Those individuals who are higher in cynicism may suspect that the organization cannot be trusted to follow through on its promises, and when their suspicions are confirmed, they become angry.

LMX and Psychological Contract Violation

Although previous research has linked LMX to psychological contract breach (Suazo, 2002)—a precursor of violation—and aspects of personality have been linked to both LMX and psychological contract breach (Johnson & O’Leary-Kelly, 2003; Hui, Law, & Chen, 1999; Raja et al., 2004), none have examined the linkages between these factors in a unified model as does the present study. While the hypothesized relationship between LMX and psychological contract violation was supported by the zero-order correlations, this relationship shrinks and becomes insignificant when all variables were entered into the structural model.

Likewise, the correlation coefficient between LMX and psychological contract violation became insignificant, both statistically and substantively, after controlling for the effects of NA. Possibly, a subordinate’s perceptions of both LMX quality and psychological contract violation are a function of his or her level of NA. High trait NA increases a person’s sensitivity to negative stimuli present in the environment (Penney & Spector, 2005; Rusting & Larsen, 1998) and exerts an influence on his or her mood across both time and environments (Diener et al., 2002). Individuals high in neuroticism, a correlate of NA, are more likely to cognitively perceive a breach of the psychological contract as more serious and have a stronger emotional response to these perceptions, than are those lower in neuroticism (Ho, Weingart, & Rousseau, 2003).

The findings of the present study raise the question of how much of the LMX/performance relationship is due to the supervisor’s lack of skill or desire in developing high quality relationships with his or her

subordinates and how much of it is due to relatively stable characteristics of the subordinates themselves. The fact that, on average, individuals tend to behave similarly across their intimate relationships (Robins et al., 2002) suggests that the same phenomenon is occurring in the work situation. This is a concern for the organization as a whole since low-quality LMX has been linked to negative organizational outcomes such as lower in-role and extra-role performance (Hui, Law, & Chen, 1999) as well as subordinate retaliatory behaviors (Townsend, Phillips, & Elkins, 2000).

Similarly, psychological contract breach has been associated with a number of negative organizational attitudes and outcomes, including lower in-role and extra-role performance and increased absences (Johnson & O'Leary-Kelly, 2003; Suazo, 2002). Implicit in researchers' suggestions for improvement is an assumption that these relationships are the result of situational factors and that if these were changed, employees would not perceive their contracts as having been breached or violated, their perceptions of LMX would improve, and, therefore, the organization would experience more favorable outcomes. The findings of this study in no way negate the suggestions these researchers have put forth; however, they do suggest that we take into account that some employees do not come to the organization as happy, productive workers and become unhappy and unproductive because of the environment.

Some individuals will enter the employment relationship predisposed to accentuate negative events and respond in a negative fashion and will engage in negative work behaviors as a result of their perceptions of rejection and poor treatment. The results of this study suggest that efforts to improve the subordinate/supervisor relationship and the subordinate's perceptions of psychological contract violation may be met with limited success unless we understand the individual's role in creating these perceptions.

Contributions and Limitations

The present research has begun the disentanglement of the complex relationship between personality, LMX, and psychological contract violation. Previous research established a link between LMX and breach of the psychological contract; however, it failed to elucidate the mechanisms through which the linkage occurred. In the present research, we tested the relationship between LMX and psychological contract violation rather than psychological contract breach. This is important in that there is evidence that psychological contract violation is more proximally associated with organizational outcomes than is psychological contract breach (Zottoli, 2003).

The two primary limitations of this study are that first, it is cross sectional in design, which is a threat to the generalizability of the findings, and second, common method bias is a concern due to the fact that both the exogenous variables and endogenous variables were measured at the same time and with the same technique. With cross sectional designs, it is not possible to establish temporal precedence of one variable over another, a fundamental requirement for the establishment of causality. It is also difficult in cross sectional designs to investigate relationships that may be reciprocal rather than unidirectional. Repeated measurements over time would provide data that would shed more light on the nature of the relationships.

The fact that both the exogenous variables and endogenous variables were measured at the same time and with the same technique raises the possibility of inflated estimates of the relationships between the constructs. Monomethod research also increases the chance of masking non-linear relationships between constructs (Baltes, Bauer, Bajdo, & Parker, 2002). To minimize the possibility of common method bias in this study, we collected data from several different organizations and from both supervisors and their subordinates. The data from the supervisors were used as a check on the subordinate reports of LMX.

While there were differences, the parameter estimates for the relationships in both sets of data were in the same direction, that is, positive or negative, and similar in magnitude. The exception to this was the

relationship from PA to LMX. It was much weaker in the model which included supervisor rated LMX. However, this is consistent with previous findings regarding the propensity of people to give more weight to negative information than to positive information in attribution making (Fiske, 1998).

While the pooling of data from different organizations may be considered as a strong point of this study in the sense that it serves to reduce common method bias, it also represents a limitation in that group-specific variables may be operating in the samples from the different organizations (Byrne, Shavelson, & Muthen, 1989). Covariance matrices can be tested for homogeneity of structure between groups, however, in the present study the small sample size per group imposes a limitation on the potential for this test since the individual sample sizes are too small to provide the necessary power.

Practical Implications

Broad exhortations to better train supervisors to develop high-quality LMX with all of their subordinates in hopes of positive organizational outcomes tend to ignore that portion of the relationship that is influenced by the subordinate. Likewise, while blatant violation of promises on the part of the organization represents a case of a strong situation, more subtle violation is often unintended and unavoidable. This is not to say that organizational interventions will not have net positive effects. Supervisor training which increases contact and feedback between the supervisor and subordinate has been found to increase subordinate positive affect and job satisfaction (Norman, 2003). Conversely, negative experiences with supervisors have been associated with poorer employee-client relationships and employee career disillusionment (Ramos-Sanchez, Esnil, Goodwin, Riggs, Touster, Wright, Ratanasiripong, & Rodolfa, 2002). It is easier to induce NA than it is to induce PA (Nummenmaa & Niemi, 2004) and evidence suggests that supervisors who respond to subordinates with positive messages and individual consideration will improve subordinate job performance (Dvir, Eden, Avolio, & Shamir, 2002).

As Wright, Cropanzano, and Meyer (2004) note, from the organization's perspective there are two routes to increase worker PA while decreasing NA: manage it or select for it. As they also point out, the selection of employees based on the probability that they are predisposed to high PA or high NA, raises serious ethical questions. If we discount the selection avenue based on ethical objections, the question then becomes: "How do we manage it?"

Social relationships have been found to be a necessary condition for the presence of PA (Bocchino et al., 2003), and *leadership* development may be one method of strengthening social ties within the organization. Leadership development involves groups and focuses on building people's capacity to learn and prepare themselves for unseen challenges in the context of the group, while leader development is focused on a single individual and is intended to develop and hone leadership skills (Day, 2001). In this manner, employees across organizational levels are provided an opportunity to develop skills that could facilitate higher quality relationships with their supervisors.

Another possibility is to provide employees access to opportunities for self-development. Recent research indicates that there may be individual level interventions that, when consistently practiced, will increase positive emotionality for participants (Seligman, Steen, Park, and Peterson, 2005). One of these was merely a daily exercise in which subjects recalled and committed to writing three positive events and their causes. Six months after the subjects began this exercise they continued to experience elevated levels of PA versus their baseline PA.

While it may be difficult to exert a great deal of influence on a fairly stable trait such as NA, there is evidence that the negative feelings that are generated by such a trait can be mitigated. However, in some cases, the cost may exceed the benefit. Highly structured jobs may not provide the opportunities for high

quality relationships to develop between a supervisor and a subordinate, and therefore, interventions might have little effect on the employees' positive emotionality.

Future Research

Future research may focus on the inclusion of specific affect variables as well as situational variables. The higher order scales of NA and PA can be divided into more specific lower order affect scales to provide a more fine-grained investigation into the effects of PA and NA on LMX and psychological contract violation. If specific aspects of affect were shown to be responsible for the relationships that were found here, future research could focus on the relationships between these lower order variables and other variables of interest.

The present model can also be embedded in a larger model of subordinate and supervisor network relationships. There is evidence that LMX can be a double-edged sword in that subordinates who have high-quality relationships with their supervisors are subject to a "guilt by association" phenomenon and do not have the same access to organizational resources as their lower LMX cohorts (Sparrowe & Liden, 2005). The possible non-linearity of these relationships may be investigated by more in-depth data collection techniques such as interviews with employees and their supervisors, as well as repeated administrations of the instruments.

Lastly, various interventions may be examined to determine whether they will improve LMX and reduce psychological contract violation. These interventions may be borrowed from existing leadership development programs or adapted from those being currently investigated in the field of positive psychology (Seligman, Steen, Park, & Peterson, 2005).

CONCLUSION

Our goal in this study was to investigate the relationships between the enduring personality traits of positive affect, negative affect, cynicism, and the outcome variables of LMX and psychological contract violation. We developed a model based on theory drawn from the areas of social psychology, LMX, and the psychological contract. We hypothesized that PA would be positively related to LMX quality and negatively related to psychological contract violation, while NA and cynicism would show the opposite pattern. We also hypothesized that LMX would be negatively related to psychological contract violation and would partially mediate the relationships between PA, NA, cynicism, and psychological contract violation. Survey data was gathered from 278 subordinate and 72 supervisor respondents across five organizations. Two models, one incorporating subordinate-rated LMX and another incorporating supervisor-rated LMX were then tested using structural equation modeling, a technique that accounts for measurement error and allows a simultaneous comparison of the proposed relationships.

Our results indicate that higher levels of NA may predispose employees to develop less supportive relationships with their supervisors as well as be more likely to perceive that organizations do not fulfill the promises that the employees believe them to have made. Conversely, higher levels of PA are linked with higher quality LMX and a tendency to perceive that the organization has fulfilled its promises. The data did not support our hypothesis of LMX as a partial mediator between employee affect and their perceptions of psychological contract violation. A post hoc correlation analysis indicated that LMX and psychological contract violation are linked through the effects of negative affect.

The cross-sectional nature of our data does represent a limitation with respect to the strength of our conclusions. Future research may attempt to gather data at different points in time in order to establish temporal precedence of the independent variables. The model may also be developed further in that the relationships between personality constructs and the outcome variables may be deconstructed into finer

grained relationships based on lower-order sub-traits. Situational variables such as management style, job design, and organizational culture may also be included in order to determine the point at which these factors suppress the influence of personality.

It is our hope that the findings presented here are not taken as deterministic, in that individuals should lay blame for their present circumstances on conditions that are beyond their control. While initial conditions do exert an influence, the mere fact that we are aware that they exist is a step toward finding ways to either ameliorate or accentuate their effects. The model presented here is incomplete in that it does not explain 100% of the variance in LMX or psychological contract violation. There are other factors at play and these factors may be more amenable to alteration.

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THE DETERMINANTS OF INTELLECTUAL CAPITAL DISCLOSURE AMONG MALAYSIAN LISTED COMPANIES

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ABSTRACT

The objectives of this study are to identify the determinants and the extent of intellectual capital disclosure among Malaysian listed firms. The variables tested in this study are (1) age (2) size (3) leverage (4) profit; (5) ownership and (6) growth. A sample of 150 companies listed in Bursa Malaysia was selected consisting of five industries: Information Technology, Consumer Product, Industrial Product, Trading/Services and Finance. The result show that about 72.6 percent of the companies selected disclosed intellectual capital in their annual reports. That data show that four variables are determinants of intellectual age, size, director ownership and growth.

JEL: M41

KEYWORDS: Intellectual capital, human capital, relational capital, structural capital

INTRODUCTION

Intellectual capital (IC) disclosure has received increasing attention among companies around the world including Australian and Italian companies. In Malaysia, the development of human capital of the nation is a targeted area under the Ninth Malaysia Plan. To be competitive in the global market, a progressively developing Asian country like Malaysia has to effectively transfer from an input-driven to knowledge-driven economy that focuses more on utilizing human knowledge and skills, rather than on production of labor-intensive goods (Goh, 2005). IC has been regarded as a prominent source of competitive advantage for various organizations, which influence the level of innovativeness and creativity. This in turn leads to improved business performance and country economic growth (Nik Maheran et al. 2006). However, in Malaysia few companies report identifiable intangible assets. Tan (2000) found that only 0.2 percent of total assets of companies listed on the Bursa Malaysia (formerly known as Kuala Lumpur Stock Exchange) revealed intangible assets other than goodwill. He also noted that the number of companies reporting identifiable intangible assets was insignificant.

The disclosure of intellectual capital in Malaysian companies may be influenced factors such as; director ownership, firm age, level of leverage, size of firm, profitability and firm's growth. This study is conducted to investigate the factors which affect the voluntary intellectual capital disclosure among Malaysian listed companies. The remainder of the paper is organized as follows. Section 2 briefly discusses the relevant literature. The next section will succinctly discuss the data and methodology used in this study. Section 4 provides the empirical findings and section 5 concludes the paper.

LITERATURE REVIEW

Intellectual capital is defined as intangible assets including technology, customer information, brand name, reputation and corporate culture. These assets are invaluable to a firm's competitive power (Low and Kalafut, 2002). Low and Kalafut (2002) conclude that intellectual capital consists of three components. The first component is tacit knowledge and innovativeness of the employees. The second

component is infrastructure of human capital such as good working systems, innovation and improvement processes of structural capital. The last components is external relationships of the firm such as customers' capital. Nick Bontis, (Director, Institute of Intellectual Capital Research, Associate Editor, Journal of Intellectual Capital), states "Intellectual Capital is the currency of the new millennium. Managing it wisely is the key to business success in the knowledge era." There are many reasons for the companies to disclose intellectual capital information in their annual reports. They are (a) to help organizations formulate their strategies, (b) to assess strategy executions, (c) to assist in diversification and expansion decisions, (d) to use as basis for compensations and to communicate measures to external stakeholders (Marr et al., 2003).

Three approaches to measuring intellectual capital have been suggested by Brennan (2001). The first is to employ existing value-based measures. The value of intellectual assets is the difference between the market value of the firm and its book value. A second approach is known as "Skandia Navigator". This approach was introduced for a Swedish firm named, Skandia. This approach refers to methods which identify and quantify critical success factors in five dimensions of the company's business (Brennan, 2001). The model proposed by Edvinson and Malone (1997) includes five dimensions: financial, client, human, processes, renewal and development as elements of the intellectual capital system. The third approach refers to the Intellectual Capital Index. Through this approach, a key measures of individual firm success must be first identified and weighted by importance to provide a single summary index. Some researchers argue a single aggregate measure is unhelpful Booth (1998).

Bruggen (2009) examines determinants of Australian firm's decisions to disclose intellectual capital in their annual reports. The IC disclosure in this study is measured by a modified methodology of Bontis (2003) and Vergauwen and Van Alem (2005). That is, the 36-intellectual capital related terms collected by researchers in the World Congress on Intellectual Capital. The authors found that, industry type and firm size plays key roles as determinants for the disclosure of intellectual property in their annual reports.

Another study conducted by White et al. (2007) found that key drivers for IC disclosure are board independence, level of leverage and firm's size. These variables have a significant relationship with the level of voluntary intellectual capital disclosure among biotechnology companies in Australia.

For the purpose of this study, the signaling theory suggests that more profitable firms will disclose more information to their stakeholders about good performance. Signaling theory is based on two general assumptions (Myers and Majluf, 1984). Firstly, managers are better informed than shareholders or the public concerning the firm's positions. Secondly, given that managers have an information advantage, they may choose to disclose information in an attempt to signal the firm's position to the public.

DATA AND METHODOLOGY

Hypotheses Development

Bukh's et al. (2005) found that, there is no significant relationship between firm age and firm intellectual capital disclosures. Additionally, the study conducted by White et al. (2007) found no significant relationship between firm age and the level of voluntary intellectual capital disclosure among biotechnology companies in Australia. This leads to the first hypothesis as follows:

H1: There is no significant relationship between firm age and intellectual capital disclosure

Bozzolan et al. (2003) investigate the annual reports of 30 non-financial companies listed in the Italian Stock Exchange in 2001. Adopting Guthrie and Petty's (2000) framework with some modifications, they conclude that company size and industry influence the amount of intellectual capital disclosure in Italian companies. Additionally, the study conducted by White et al. (2007) found that firm size had a significant

relationship with the level of voluntary intellectual capital disclosure among biotechnology companies in Australia. This leads to the second hypothesis as follows:

H2: There is a significant relationship between firm size and intellectual capital disclosure

The study conducted by White et al. (2007) found that level of leverage had a significant relationship with the level of voluntary intellectual capital disclosure among biotechnology companies in Australia. Based on these findings we propose:

H3: There is a significant relationship between level of leverage and intellectual capital disclosure

Singh and Van der Zahn's (n.d.) intellectual capital study confirms Craswell and Taylor's (1992) study of voluntary reserve disclosures, in that there was no significant association with ownership structure.

H4: There is no significant relationship between ownership concentration and intellectual capital disclosure

Profitability: McNally et al. (1982) found that the profitability measure was not significant in explaining voluntary disclosure by New Zealand companies. Additionally, Meek et al. (1995) found no significant relationship between profitability and voluntary annual report disclosure by US, UK and Continental European multinational corporations. Furthermore, a study conducted by Zaludin (2007) found that profitability does not affect the level of intellectual capital disclosure in Malaysian's companies. Thus, we hypothesize:

H5: There is no significant relationship between profitability and intellectual capital disclosure

A study by Akhtaruddin and Hossain (2008) indicates that growth firms benefit from higher levels of voluntary disclosure. Since, there are limited studies conducted in examining the relationship between firm growth and intellectual capital disclosure, there is no evidence to explain the relationship between both variables. Due to the result found by Akhtaruddin and Hossain (2008), it is expected that firm with high growth opportunities are more likely to disclose intellectual capital because the disclosure will benefit them. Thus, we propose:

H6: There is significant relationship between firm growth and intellectual capital disclosure

Variable Measurement

Measurement for Intellectual Capital Disclosure (Dependent variable) In order to measure intellectual capital disclosure, the study used an intellectual capital disclosure index by replicating a modified methodology by Bontis (2003) and Vergauwen and Van Alem (2005). That is, the 36- intellectual capital related terms collected by researchers in the World Congress on Intellectual Capital. The congress categorized the 36 terms into three categories; (a) human capital; (b) structural capital and (c) relational capital. Because of the presence of some general terms related to the field of intellectual capital, Bruggen (2009) modified the model by placing additional terms into the fourth category called "General Terms". None of relational capital terms appear in the sample firm's annual report. Hence, this study uses three additional terms. The additional terms are (1) investor relations; (2) customer relations; (3) supplier relations. It is expected that, these three terms give significant result in this study since some of the samples are operating in the Financial and Information Technology sectors. It is assumed that these companies are highly involved in the relation with customers, suppliers and investors. Hence, relational capital should be added to this analysis.

*Measurement for Independent variables:*The factors being studied in examining the relationship to intellectual capital disclosure are:Firm Age measured in years from the date of listing on the Bursa Malaysia until the end of year 2009. Firm Size measured by the natural logarithm of total assets of the company. Leverage measured as the level of external financing of the companies is measured by the ratio of total liabilities over total assets as at the end of the 2009 financial year. Director ownership measured based on the percentage of shares hold by the directors in the companies as at the end of 2009 financial year. Profitability measured through the ratio of operating profit (EBITDA) to total assets. Growth, measured using market to- book- value (MTBV) of common shares. MTBV is defined as the ratio of market price per share to value of equity per share at the end of the 2009 financial year.

Data Collection and Procedures

A sample of 150 companies listed in Bursa Malaysia was randomly selected across five industries: Information Technology, Consumer Product, Industrial Product, Trading/Services and Finance. The study used a secondary data gathered from various sources such as company annual reports and the DataStream database. Annual reports for 2009 were used to extract the relevant information. The 2009 annual reports were chosen as they had incorporated several changes as stipulated in the revised Malaysian Code of Corporate Governance (MCCG). After the revision of MCCG (2007) Malaysian companies are expected to voluntarily disclose more information in their annual reports.

Data was also gathered through the DataStream Database where the information regarding the company's financial data such as total assets, total liabilities, and other information can be easily obtained. To ensure the validity and reliability the data were manually cross checked using the company's annual report. Data was also gathered by accessing to the website of Bursa Malaysia. Some data collected from DataStream needed to be confirmed with Bursa Malaysia, e.g. the listing age for the companies. Several circulars from the Bursa Malaysia website were gathered to ascertain the official listing date of the companies.

The first part of the analysis describes demographic and financial characteristics of the sample firms. Descriptive analysis is carried out using Statistical Package for the Social Science (SPSS). Next, the content analysis was performed. The content of the annual reports of the relevant companies was investigated with regard to certain words. To complete this analysis a computer scanning system was used to scan the annual reports and identify IC terms in the annual reports. To enhancing the reliability of the data terms that appear in the annual reports were cross- checked through manually reading the related pages. After that, the identified are counted for the number of times it appeared in the annual report for the year. The study ignored the terms that appear in the director's profile, the name of the seminar or activities, and the repetitions of an award's name. This is because the terms that appeared in the sections mentioned above did not make sense for measuring total intellectual capital disclosure among Malaysian companies. For example, the directors of the company holds a degree in Information Systems. The information system term in this sentence do not symbolize structural capital. Hence, it is practical to disregard this term in calculating the frequencies of IC disclosure among Malaysian companies. The result of the analysis on the content of annual reports is shown in Table 2 and Table 3.

Additionally, Ordinary Least Square (OLS) regression was performed for testing the hypothesis using Statistics of Analysis Data (Stata). The following regression equation was estimated to identify the determinants of IC disclosure with the results presented in Tables 4 and 5.

$$IC\ Disclosure = \beta_0 = \beta_1(Age) + \beta_2(Size) + \beta_3(Leverage) + \beta_4(Ownership) + \beta_5(Profitability) + \beta_6(Growth) + \epsilon_i \quad (1)$$

Where;

$IC\ Disclosure_i$	= Intellectual capital disclosure of company i
Age_i	= Age of company i
$Size_i$	= Size of company i
$Leverage_i$	= Level of leverage of company i
$Ownership_i$	= Percentage of directors ownership in company i
$Profitability_i$	= Profit of company i
$Growth_i$	= Growth of company i
β_0	= Constant
$\beta_1 - \beta_6$	= Coefficient of the explanatory variables
ε_i	= Error or disturbance terms of company i

Empirical Findings

Table 1 shows the descriptive statistics. The left side reports information for the Ace market. The right side reports data for the Main Market. Mean, standard deviation, minimum and maximum data are reported for each variable. ACE Market contributed 30 companies in the IT sector while Main Market contributed 120 companies in Consumer Product, Industrial Product, Trading/Services and Finance sectors. Table 1 indicates that there is a small difference of about 0.68 percent in means of total intellectual capital disclosure between of both markets. The ACE Market indicates about 2.91 percent of IC disclosure while the Main Market shows a value of 3.59.

Table 1: Descriptive Result

	ACE MARKET				MAIN MARKET			
	Mean	Std. Deviation	Min	Max	Mean	Std. Deviation	Min	Max
AGE	5.270	1.741	2.000	10.000	15.130	10.202	2.000	49.000
SIZE	17.229	1.319	13.203	19.095	20.104	1.976	17.212	26.202
LEVERAGE	0.5486	0.8829	0.0164	3.848	0.5252	0.2886	0.0942	1.917
OWNERSHIP	0.2571	0.2155	0.000	0.7912	0.1487	0.1946	0.0000	0.8704
PROFITABILITY	-0.3500	1.390	-7.337	0.2639	0.0306	0.2216	-1.371	0.4021
GROWTH	1.106	1.892	-5.910	5.560	0.6929	1.858	-16.810	5.030
IC DISCLOSURE	0.0290	0.0249	0.000	0.0769	0.0358	0.0312	0.000	0.1282

This table shows the descriptive results for Malaysian companies listed in ACE and Main Market.

Table 2 shows that structural capital is the most frequently disclosed category followed by relational capital. In contrast, the result found by Bruggen (2009) stated that it was very hard to find relational capital items disclosed in the annual reports of Australian firms. The differences above are consistent with the expectation that adding extra terms under relational capital would give significant influence to this study compared to the study done by Bruggen (2009).

Table 2: Intellectual Capital Disclosure – by Industry

Industry / Items	Human Capital	Structural Capital	Relational Capital	General Terms	Total
Information	19	51	12	1	83
Consumer Product	17	17	12	1	47
Industrial Product	6	16	14	0	36
Trading / Services	26	23	20	0	69
Finance	75	52	93	1	221
Total	143	159	151	3	456

This table shows the number of companies disclosed intellectual capital in their annual report. The companies were categorized according to its industry while intellectual capital was categorized according to its components.

It clearly shows that Malaysian firms absolutely engaged in investor, customer and supplier relations. By scrutinizing all industries selected, the results show that the finance and information technology industries disclosed more intellectual capital items than other industries. This result supports the result found by Bruggen (2009), where Australian firms involves in High-tech industries and Information System were among the industries that frequently report about intellectual capital.

Of the 39-IC related terms, only 15 terms appeared in the annual reports of Malaysian listed companies as shown in Table 3. Of those terms, “human capital” was frequently disclosed with a score at 138 times followed by investor relation at 111 and information system at 97. Additionally, out of 150 samples, the result also found that 72.67 percent of companies disclosed IC in their annual reports reflecting a very high disclosure of IC in Malaysia.

Besides that, in terms of disclosure location, IC information is reported in several sections in the annual reports. This information commonly appeared in the financial statements and notes to financial statements, followed by a director’s report, statement of corporate governance and other operational reports. Intellectual capital work is mostly managed by senior management Bontis (2001), so the location of IC disclosure demonstrates the company’s concerns in reporting intellectual capital.

Table 3: Intellectual Capital Disclosure – by Terms

Human Capital	Times	Structural Capital	Times	Relational Capital	Times	General Items	Times
Employee expertise	0	Structural capital	0	Relational capital	0	Economic value added	0
Employee know-how	0	Intellectual property	54	Supplier knowledge	0	Intellectual capital	2
Employee knowledge	0	Cultural diversity	0	Customer knowledge	0	Intellectual resources	0
Employee productivity	0	Organizational structure	0	Customer capital	0	Intellectual asset	0
Employee skill	1	Corporate learning	1	Company reputation	0	Knowledge asset	0
Employee value	1	Organizational learning	0	Investor relation	111	Knowledge stock	0
Human capital	138	Corporate university	0	Customer relation	40	Intellectual material	0
Human asset	1	Knowledge sharing	2	Supplier relation	0	Business knowledge	1
Human value	2	Management quality	2			Competitive intelligence	0
Expert team	0	Knowledge management	3				
		Information system	97				
		Expert network	0				
Total	143		159		151		3

This table shows the frequency of intellectual capital terms appeared in the annual report of Malaysian companies.

The table 4 shows that, using a two-tailed test, the only statistically significant coefficients are: Size with ($\beta_2 = 0.004$, $p < 0.01$), Growth ($\beta_6 = 0.015$, $p < 0.05$) and Ownership ($\beta_4 = 0.093$, $p < 0.1$). However, for ownership, it is marginally significant since “p” is close to 0.1.

Table 4: Regression Result (Run Simultaneously)

Total IC	Coef.	Std. Err	t	P > t
Age	0.0001	0.0002	0.380	0.7040
Size	0.0048	0.0016	2.930	0.0040***
Leverage	0.0074	0.0113	0.660	0.5100
Ownership	-0.0187	0.0110	-1.690	0.0930*
Profitability	-0.0012	0.0056	-0.210	0.8310
Growth	0.0025	0.0010	2.460	0.0150**
				R-squared = 0.2202

This table shows the regression result if the estimated equation was run simultaneously between all independent variables and dependent variable. Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

This table 5 shows that there are four significant coefficients between total IC: age with a coefficient of 0.0007 and $p < 0.01$; size ($\beta_2 = 0.058$, $p < 0.01$); ownership ($\beta_4 = -0.0324$, $p < 0.01$); and growth, with a coefficient of 0.0027 and $p < 0.05$, when these data were run individually.

Table 5: Regression Result (Run Individually)

Total IC	Coef.	Std. Err	t	P > t
Age	0.0007	0.0002	3.22	0.0020***
Size	0.0058	0.0013	4.51	0.0000***
Leverage	0.008	0.0055	1.44	0.153
Ownership	-0.0324	0.0101	-3.22	0.0020***
Profitability	0.0023	0.0017	1.36	0.176
Growth	0.0027	0.0011	2.52	0.0130**

This table shows the regression result when each independent variables was run individually against dependent variable. Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

CONCLUDING COMMENTS

The objectives of this study are to know the determinants and extent of intellectual capital disclosure among Malaysian listed firms for the year 2009. Variables tested in this study are: age, size, leverage, profit, ownership and growth. A sample of 150 companies listed in Bursa Malaysia was selected consisting of five industries: Information Technology, Consumer Product, Industrial Product, Trading/Services and Finance. Descriptive statistics, content analysis and an OLS regression model were used to analyze the data. The results show a high percentage, about 72.6 percent, of firm's selected disclosed intellectual capital in their annual reports. From six variables tested, four are identified as determinants of intellectual capital among Malaysian listed companies. Determining factors are age, size, director ownership and growth. The results support the findings by Bruggen (2009) and White et.al (2007), who find that size and ownership are significant in explaining intellectual capital disclosure.

The extent of the intellectual capital disclosure among Malaysian companies is still relatively low as indicated by the average intellectual capital disclosure of 3.59 percent for Main Market and 2.91 percent for ACE Market. However, the result also show a high percentage, about 72.6 percent, of the companies selected disclosed intellectual capital in their annual reports. The low level of the extension of IC disclosure is due to the measurement used in this study. The extent of IC disclosure is measured by dividing the number of items disclosed by the companies with the total items used in the study for each category of IC. In calculating the number of items disclosed, the repetition in the annual report is disregard in this study. This result revealed that most of Malaysian companies are aware of intellectual capital disclosure, however, they are not aware of how to measure, report and disclose this information in their annual report. This is consistent with the conclusion made by Gutherie and Petty (2000). They conclude that Australian companies report less on IC disclosure in their annual reports due to the poor understanding, inadequately identified, inefficiently managed and reported IC in a consistent framework.

It must be noted that this study has limitations. Firstly, the study was done over a limited time and was completed within a period of three months. Therefore, a sample size is limited to 150 companies and one year of data only. This small sample will not comprehensively or accurately illustrate the real situation occurring in Malaysia. Additionally, the study focused on Malaysia, and therefore the result cannot be generalized to other countries. The second limitation is related to content analysis. Analyzing the annual reports based on the specified list of intellectual capital (IC) means it may not provide the whole picture of IC disclosure practices in Malaysia. This study used a modified methodology by Bontis (2003) and Vergauwen and Van Alem (2005). A major limitation of this methodology is that it used 39 items. Finally, annual reports are analyzed using computer scanning in deriving the number of items that appear in the annual report. The computer could skip a similar item with different wordings. The study could be improved in the future in several ways. As this study has been conducted using a small sample and one year data future studies should examine larger samples. To further improve the research, the sample could be widened and focus on all companies listed in Main Market. The number of years could also be increased to five years in order to see the pattern or trend of intellectual capital disclosure among Malaysian companies. With these modifications perhaps more conclusive results could be obtained.

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EVOLUTIONARY ALGORITHM PARAMETER FITNESS: AN EXPLORATORY STUDY

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ABSTRACT

Genetic algorithms were the first evolutionary algorithm designed. These algorithms simulate natural selection to produce good solutions quickly for complex problems. Job shop scheduling with sequence dependent setup times is an NP-hard problem – any algorithm to optimize this problem has an exponential time. We explore which parameters for a genetic algorithm allow it to solve these job shop problems in limited time trials. Prior literature assumes the use of these parameters is beneficial, and the parameter values are selected either based on prior research values or from design of experiments on a limited range of parameter values. Multiple linear regression is used to determine which parameters can significantly improve solutions. Our results show that a proportional 50/50 crossover parameter and a large population size are the two parameters to obtain good solutions in a constrained time environment.

JEL: C20, C60

KEYWORDS: Evolutionary Algorithms, Genetic Algorithm, Regression, Job Shop Scheduling

INTRODUCTION

Sequence dependent job shop scheduling (SDJSS) is a complex problem because it is NP-hard – any algorithm to optimize this problem has an exponential time – as the size of the problem increases, the computation time increases exponentially. Because the setup time of the next job on a machine is dependent on what was run on the machine previously, there is no linear method to optimize this class of problems. In shop floor scheduling, the most important objective is to produce a feasible schedule quickly. In the space of all feasible solutions, company defined goals drive which feasible solutions are better, and even which one is optimal. However, as the size of the problem becomes larger, and therefore nontrivial, the calculation time to find the optimal solution increases exponentially. Pure heuristics are quick to produce feasible solutions, but when more constraints are added to the model of the manufacturing environment, they cannot handle this added realism so their solutions may be far from optimal. We will test the ability of a genetic algorithm (GA) to achieve a good solution for complex job shop scheduling problems with sequence dependent setup times, staggered job release times (not all material is available for all jobs at time 0) and recirculation (a job can visit a machine multiple times). Genetic algorithms are a class of algorithms that can handle much complexity, and by design will converge toward an optimal solution as the number of iterations of the routine increases. This research is important because finding the best solution in a limited time is highly relevant for business scenarios. Therefore, finding which parameters contribute to solution goodness, and which are not statistically relevant is of importance for finding better solutions via evolutionary algorithms. Further, any parameters that do not contribute to solution goodness do not have to be programmed, thus reducing the complexity of the computer program and parameter value selections.

This paper is organized into the following sections; first is a literature review of job shop scheduling, sequence-dependent setups in scheduling, and GAs as an optimization tool. This is followed by sections containing a description of the problem we are trying to solve, the mechanics behind how a GA works in general and specifics on our genetic algorithm. The next section contains the results of our regression

tests. The final section is the summary and discussion of the implications of the results along with directions for future research.

LITERATURE REVIEW

By their nature, job shop scheduling problems are complex. Job shops provide a unique scheduling problem because the routings are based upon the jobs that need to be processed; therefore the resource requirements are not based upon the quantity as in a flow shop, but rather on the routings for the products being produced. Heuristics have been developed to find optimal nondelay schedules in a job shop environment (Hutchinson and Chang, 1990). The heuristic in their paper minimizes makespan in an environment that does not contain sequence-dependent setup times. Heuristics are often problem size independent, but provide good solutions according to single criteria objective functions only. This research uses more real-world multiple criteria objective functions.

Sequence dependent setup times are explored in the literature for flow shops (Vakharia and Chang, 1990). Single machine scheduling with sequence dependent setup times is also explored in the literature. This problem is scheduled using a hybrid genetic algorithm (Miller, Chen, Matson and Liu, 1999). Manikas and Chang (2009) use a genetic algorithm to solve sequence dependent setup time job shop scheduling problems. However, their GA parameters and settings were based on limited experimental trials. Rubin and Ragatz (1995) schedule n jobs on a single machine with sequence dependent setup times using a Genetic Algorithm. A common solution to problems with sequence dependent setup times is to batch together like jobs to minimize setup times. This has been done on single machine problems (Cheng et al., 2001).

Genetic algorithms are a viable approach to solving optimization problems. The principles of GAs proposed by Holland (1975) are the foundation of evolutionary algorithms. Genetic algorithms simulate evolution via natural selection. The idea is to evolve a population of candidate solutions using operators inspired by natural genetic variation and natural selection (Mitchell, 1996).

Classical job shop scheduling problems with a set of n jobs to be processed on m machines have been solved using a GA. Candido (1998) adds realistic constraints and uses multiple objectives for their GA. The GA is used to find the initial solutions and refine locally improved solutions. However, this routine cannot handle sequence-dependent setup times. The ability of GAs to handle complex constraints is further shown by allowing dual-resource constraints in a scheduling problem (ElMaraghy, Patel, and Abdallah, 2000). They achieve better solutions by forcing feasible solutions from birth rather than allowing infeasible solutions to exist in the population. They choose to use a random initial population rather than heuristic based criteria to create an initial population that was intelligently designed. The paper also shows that linear order crossover (LOX) performs better than partially matched crossover for their particular problem. The LOX crossover method preserves the relative position between genes (Falkenauer and Bouffouix, 1991).

A GA is used to solve a job-sequencing problem (Zhao and Wu, 2001). They show that a feasible, good solution can be found in a reasonable time for this problem. Ombuki and Ventresca (2004) introduce crossover and mutation operators as well as an encoding scheme that ensure the GA schedule remains deadlock free. We chose to always have only feasible solutions in the population because scoring an infeasible solution regarding lateness does not make sense – an “on time” solution that was achieved by having operations scheduled not following the routing cannot be scored as a solution. We encode machine sequences and use mutation and crossover operators that ensure those sequences are always feasible.

Tuning parameters such as population size and number of generations can have a positive effect, but Mattfeld and Bierwirth (2004) state that if the parameters are within useful bounds, the expected improvement usually does not justify the costs of finding an even more appropriate fine tuning. Using domain specific knowledge, Miller et al. (1993) are able to improve the running speed of their GA for a multiple fault diagnosis problem. Najafi et al. (2009) tune population size and mutation probability real-time for a resource investment problem. A GA has certain parameters (e.g., population size, number of generations, etc.) that have to be specified. Finding the correct combination of settings is time consuming, so a self adapting genetic algorithm is discussed that seeds the parameters with random levels and has mechanisms to adjust them during the run (Sawai and Kizu, 1998). However, real time tuning takes precious CPU time away from the mechanisms in the GA that converge the solution toward optimal. Some research selects parameter values based solely on prior used values in research. Ojha et al. (2009) uses a set value for number of generations and population size.

Nagano et al. (2008) use ANOVA with six levels for population size, and after 68 combinations, find that their largest population size does best. Ruiz et al. (2006) test five levels for mutation probability and four levels for population size for flowshop problems. They find the best population size was the largest one. In our research, we analyze different parameter levels via regression to determine the parameter settings up front. Multiple objectives are handled easily with GAs. Having a single objective to solve for does not give the production planner much control to differentiate among many competing requirements or constraints. Richter (2002) argues that the use of a multiple objective fitness function has a positive effect on convergence speed. Our job shop scheduling problem involves earliness and tardiness as its two criteria, which are relatively comparable and competing. A single simple genetic algorithm is flexible, but cannot be efficient for all problems (Leonhardi et al., 1998). The encoding scheme, operators (crossover, mutate, elite, etc.) and specific parameters all need to be specified for a particular class of problems.

Problem Description

In many manufacturing environments, the sequence of jobs run on a particular machine affects the setup time. Job shop environments can have significant differences in setup times depending on the sequence of jobs run through the resources. For example, products with significant color differences are likely run from lighter to darker colors with minimal cleaning, but going from a black color product to a white color would require much more time to prepare the machine to avoid black bleeding through and creating a grayish batch.

In manufacturing environments a feasible solution is a must. An optimal solution to a scheduling model is a goal that often cannot be obtained given data and time constraints. However, a schedule certainly would benefit from having a schedule closer to optimal rather than just merely feasible. Heuristics can quickly create feasible solutions, but as problem complexity increases, the solutions may be far from optimal. Commonly used heuristics are Shortest Processing Time (SPT) and Earliest Due Date (EDD) that use a single regular measure as the criterion. We find the appropriate parameter settings for our GA to generate the best solutions quickly for multiple criteria.

To make our job shop scheduling problems more realistic, the environment contains staggered release dates and recirculation in addition to sequence setup times. Staggered release dates means that we do not assume all jobs are ready to start at the same time. Recirculation is the ability of a job routing to visit the same machine more than once. The job shop scheduling problems used in this paper are non-delay, meaning that a machine must process a job if it is available.

The setup times on a machine vary according to the job family of the previously processed job on that machine. A schedule is evaluated by looking at the total tardiness and total earliness. A multiple criteria

objective function allows the solution result to better fit a company's needs. In this case, using the single criteria of tardiness may produce a result that has several jobs finishing very early. Having resources committed to finish jobs early reduces flexibility because that capacity could be left free for future orders that really do need to begin processing earlier to meet their due dates. Therefore, adding a second criteria to the objective function to minimize earliness gives additional weight to solutions that are closer to just in time. The weight for tardiness is set to 1000 times that of earliness. A large number was chosen because tardiness is, in general, much less acceptable in production than being early. However, among the set of solutions with equivalent tardiness, solutions that are less early are preferred. This rewards a schedule for not being tardy but also gives minor reward for being more just in time. Adjusting the weights can affect the final solution generated by the genetic algorithm. This gives flexibility for a production planner to adjust the weights on multiple objectives to force the genetic algorithm to find better solutions according to his/her criteria. Each job's routing is known a priori, but the operations sequences on the machines are unknown and have to be determined.

The objective function is: $1000 * \text{tardiness} + 1 * \text{earliness}$. We use just two weighted criteria (tardiness and earliness) here, but having many criteria has little effect on the speed of calculation because only after the mechanisms produce solutions are they evaluated one time according to the objective function. The lower the score according to the objective function, the better the schedule solution. For easier comparison between the different problems solved in this paper as well as between the different methods used, scores presented in the results section are expressed as a percentage of optimal.

Mechanics of Genetic Algorithms

The basic structure of the Genetic Algorithm is:

Initialize

Evaluate

Loop for Reproduction

 Clone Elite

 Mutate

 Breed Crossover

 Replace Population with Children

 Evaluate

Until Termination Criteria (e.g., one minute time limit)

Finding the optimal values for the GA parameters is important for making the heuristic converge to an optimal solution more quickly. From our literature review, we decided to focus on seven specific parameters; Elite %, Mutate %, Population Size, Number of pairwise inversions for mutation, Crossover method, Allow crossover, and Allow mutation.

Elite percent is the top percentage of the population that survives unchanged to the next generation. This ensures that the best solution or solutions are always passed to the next generation. This forces the algorithm to have non-decreasing solutions from generation to generation. The larger the population size, the larger the number of solutions that would be considered elite.

Mutate percent allows the population to achieve random differences from those that come about from crossbreeding alone. Mutate percent is different from Elite percent in that an Elite percent of 1% only looks at the top 1% of solutions and duplicates them, while a Mutate percent of 1% looks at every solution and each one has a 1% chance of being mutated. If selected, the solution is copied to the next generation and then mutated according to inversion discussed next.

Population size is how many solutions are in each population. Intuitively, the more solutions in a population, the more likely the best one will be closer to optimal. Number of pairwise inversions for mutation specifies the probability that a solution is selected to have pairs of alleles switched. One pair may be swapped for mutation, or multiple pairs for a mutated solution.

Crossover method may be a one point method that takes the head of one parent and the tail of the other parent to create a child solution. The other common crossover method is to intermix alleles. We examine one point crossover that is at the half way point in the solution sequence, and one point chosen at a random distance within the sequence. For the intermixing of alleles methods, the crossover gives each parent allele a 50% chance of being selected, thus forming the child solution in sequence. The other intermixed method gives a higher percentage chance of selecting the more fit parent. For example, if parent 1 had a score of 100 (where lower scores are better), and parent 2 had a score of 200, rather than a 50% chance of each parent's allele being chosen, parent 1 would have a 67% chance and parent 2 would have a 33% chance of its allele chosen at any point in the sequence.

Crossover yes/no is a parameter that turns crossover breeding on or off. This is used to explore the possibility that mutation only can produce good solutions. If this parameter is set to off, then mutation is forced on. Mutation yes/no is a parameter that allows mutation to occur or not. This parameter is used to explore if mutation is needed to maintain diversity, or it can be done solely via crossover. If mutation is not allowed, then crossover is forced to be on.

TEST SPECIFICATION AND RESULTS

Regression Model for Tests

Values for each of the seven parameters fell into certain ranges: 1) Elite Percent was in the range [1%, 50%], and was a ceiling function. We must have at least the single best scoring solution survive to the next generation; 2) Mutation Percent was in the range [1%, 50%]; 3) Population Size was in the range [10, 1000] increments of 10; 4) Number of Pairwise Inversions was in the range [1, 10]; 5) Crossover Method was equally likely to select one of four methods: One point crossover at a random location, one point crossover at the halfway point of the sequence, 50% likelihood of each chromosome's allele being chosen when constructing a child sequence (50/50 method), and likelihood of a chromosome's allele being chosen proportional to the fitness of each parent; 6) Crossover allowed (Yes/No). If no, mutation must be allowed and no parent breeding will occur and 7) Mutation allowed (Yes/No). If no, crossover must be allowed and mutation percent is set to 0% and the number of pairwise inversions is set to 0.

1000 runs of the algorithm were made with random combinations of parameters above in their respective given ranges. With seven predictor variables, the regression model is a hyper plane:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7}$$

Interaction is assumed to not exist between these parameters, and therefore the first-order model above is for additive effects on mean response.

Results

The results of the multiple linear regression are shown in Table 1 where *** indicates p-values with significance of less than .01.

Table 1: Multiple Linear Regression Results

<i>Adjusted R Square</i>	0.1278	
	Coefficients	
Intercept	2641539	***
Elite %	(1825)	***
Mutate %	(1144)	
Pairwise Int	26333	***
Pop Size	(207)	***
Cross Meth	(28811)	***
MutateYN	(205636)	***
CrossYN	(50913)	

Examining all parameters shows that mutate percentage and turning off crossover are not statistically significant. These seven parameters account for 12.78% of the variance in solution goodness. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

R-Squared was 0.1339. Adding more parameters to this model can only increase R-Squared and never reduce it. Therefore, the adjusted coefficient of multiple determination adjusts R-Squared by dividing each sum of squares by its associated degrees of freedom. In this case, adjusted R-Squared is 0.1278 as shown in Table 1.

Due to the randomness inherent in the genetic algorithm, there is a wide range of values for scores. However, the coefficients for the four predictor variables and their associated p-values make it clear that there is a difference in what level each of the parameters is set to when running the genetic algorithm to solve this particular problem. Using SPSS v14.0, the following results in Table 2 were obtained for stepwise linear regression.

Table 2: Stepwise Regression

Model Summary						
Model	R	R Square	Adjusted R Square	R Square Change	F Change	Sig. F Change
1 ^a	0.237	0.056	0.055	0.056	59.528	0.000***
2 ^b	0.317	0.100	0.098	0.044	48.749	0.000***
3 ^c	0.336	0.113	0.110	0.012	13.996	0.000***
4 ^d	0.351	0.123	0.120	0.010	11.686	0.001***
5 ^e	0.363	0.132	0.128	0.009	10.258	0.001***

Five models adding in the most statistically influential parameters one at a time in a stepwise manner shows how much additional variation in solution goodness is modeled via the added parameters. ^a Predictors: (Constant), Mutate?, ^b Predictors: (Constant), Mutate?, Pop Size, ^c Predictors: (Constant), Mutate?, Pop Size, Crossover Meth, ^d Predictors: (Constant), Mutate?, Pop Size, Crossover Meth, Pairwise Int., ^e Predictors: (Constant), Mutate?, Pop Size, Crossover Meth, Pairwise Int. Elite%. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

The results above confirm the regression done in Excel 2007. Using mutation is statistically significant, but what percentage chance a candidate solution had of being mutated was not significant. Therefore, we set mutation percent to halfway within our range of values, i.e. 25%. The number of pairwise inversions per mutation was significant; specifically, the more inversions, the worse the final solution. Therefore, the number of pairwise inversions was set to one. The next tests focused on crossover method and

population size only. The results of these tests are shown in Table 3 where *** indicates p-values with significance of less than .01.

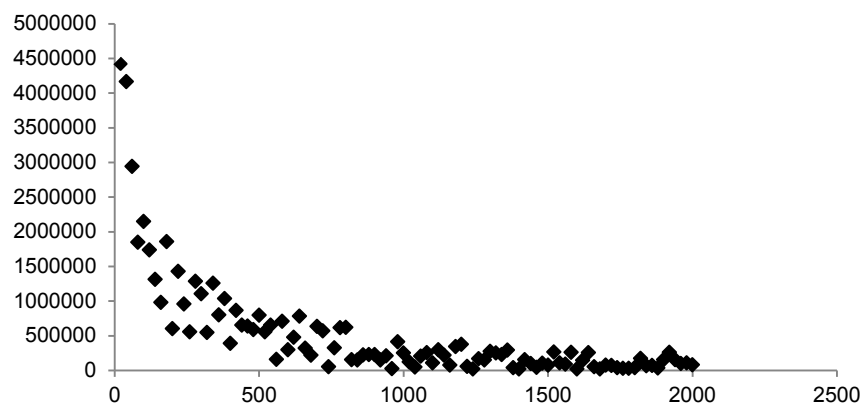
Table 3: Regression for Population Size and Crossover Only

Adjusted R Square	0.5054	
	Coefficients	
Intercept	4,285,189	***
Pop Size	(2.401)	***
Cross Meth	(680.07)	***

Population size and the crossover method chosen account for 50.54% of the variation in solutions. Furthermore, the crossover method for breeding has a very large, statistically significant coefficient (p-value <.01).

The results shown above indicate that we can simplify the model and worry only about two parameter ranges (population size and the number of generations). The programming complexity thus is reduced, and speed of computation improved. We also know that increasing either of these parameter values has a positive effect on the Y (score reduction). The significance is high so it is unlikely that the results seen are due to random variation of the data, but rather due to the change in predictor value. Furthermore, this analysis is helpful because the crossover method (Cross Meth) has a coefficient of -680.065, and population size (Pop Size) has a coefficient of -2.401. We can see that we get the most reduction in solution score by using a different crossover method for parent solution breeding. The 50/50 crossover method achieved the best results in the limited time. Population size is statistically significant in reducing solution scores to lower, better values. However, the low coefficient is counterintuitive because larger populations in prior research where time is unconstrained improve the solution greatly. Given the results of the regression, further tests were done to determine the impact of population size given the time limit. Without a time limit, increasing population size can produce better solutions. However, given limited time, having a larger breeding population may sacrifice computation time that could be used to produce more generations of offspring with a smaller population size. For population size, we tested values of 20 to 2000 in increments of 20. For each population size, 10 replications were done as shown in Figure 1.

Figure 1: Score per Population Size



The graph illustrates diminishing returns in solution goodness as population size increases. Populations increasing from 20 to 1400 show score improvement, while population sizes greater than 1400 have statistically insignificant improvements.

There is a statistically significant difference taking into account population size 20 through 1400 (p-value = .0000), however, from 1400 through 2000, the p-value is .98, meaning that score improvements are likely random versus correlated with the population size increase. This may be due partly to the increased

population size limiting the number of generations where the breeding mechanisms of the GA can improve the solution in the one minute time limit.

IMPLICATIONS AND CONCLUSIONS

Common heuristics and Genetic Algorithms can find quick, feasible solutions to job shop scheduling problems that involve complexities such as sequence dependent setup times, spaced release dates and multiple objectives. Common heuristics run quickly, but do not converge to optimal like a GA. Not all parameters for the Genetic Algorithm affect the output goodness equally. Population size up to 1400 improved solution goodness and using a 50/50 crossover method significantly outperformed the other three crossover methods explored here.

Because of the speed with which the Genetic Algorithm runs, changes to customer release and due dates, routing changes, and order deletions and additions can be reflected in a new schedule quickly. The results of this research demonstrate that good solutions can be achieved without worrying about mutation percentage. It is possible to produce good results via mutation only, but superior solutions were obtained when 50/50 crossover was used to breed parent solutions.

Future research using genetic algorithms to solve sequence dependent job shop problems likely does not require researchers to use Design of Experiments (DOE) or regression to determine which parameters and settings to use – they may use our findings directly.

A limitation of this research is that it focused on Genetic Algorithms only. A future study could examine the parameter effects of hybrid GAs or Scatter Search (Manikas and Chang, 2008). Because some of the parameters are common amongst evolutionary algorithms, we would predict similar significant parameters as we found here. A further limitation of our research is that it was used to solve sequence dependent job shop scheduling problems only. Other studies that investigate parameters for other NP-hard problems might yield different parameter settings as optimal.

This Genetic Algorithm can be enhanced by adding more weighted objectives. Resource calendars, alternate machines with different costs or scrap rates, learning curves on machines and other complexities can be added to this algorithm with relatively little additional computing power required.

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RESIDENTS' ATTITUDES TOWARD PERCEIVED TOURISM BENEFITS

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ABSTRACT

Despite the increasing research on host community perceptions toward tourism development, there is limited research on small island developing states (SIDS). This study aims to investigate the residents' attitudes toward tourism development in Mauritius, a small island developing state. Using a face-to-face questionnaire, data was collected from local residents in a community situated in the north of the country. Following data collection from a questionnaire, factor analysis and regression analyses were conducted. The results revealed that the majority of residents are supportive of tourism development in the region. Socio-cultural and economic impacts had significant and positive influence on tourism development, while environmental impacts had a negative influence on future tourism growth.

JEL: M31

KEYWORDS: Host community, Residents, Sustainable tourism development, Mauritius, Small island developing states (SIDS)

INTRODUCTION

For the long-term success of the tourism industry, it is important to understand and assess the residents' attitudes regarding the impact of tourism development (Ap, 1992; Ritchie and Inkari, 2006). Sustainable tourism development can only be achieved if stakeholders are involved in the process (Byrd, Bosley and Dronberger, 2009). Sustainable tourism entails that the community is the focal point of the tourism and planning process (Choi and Sirakaya, 2005). Additionally, investigating the host community's perceptions of tourism is important because it influences their behavior toward tourism (Andriotis and Vaughan, 2003). More than 83 academic studies were found related to residents' perceptions regarding the impact of tourism (Andriotis and Vaughan, 2003) which reflects the importance of understanding their perceptions regarding tourism development. These research have been conducted targeting communities worldwide, including those in Europe (Snaith and Haley, 1999), Australia, New Zealand, and the South Pacific (Fredline and Faulkner, 2000; Mason and Cheyne, 2000), Asia (Kayat, 2002), Africa, North America (Carmichael, 2000; Gursoy, Jurowski, and Uysal, 2002; Wang and Pfister, 2008) and Latin America. However limited studies were found in small island developing states (SIDS) and more precisely islands of the Indian Ocean. As a SIDS in the Indian Ocean, Mauritius faces the challenge of a small geographical size, peripheral location to sustain its economy. Mauritius is an important destination for international tourists and over the last 20 years, there has been an annual rise in the number of tourists.

In 2000 there were 656, 453 international tourist arrivals as compared to 930, 456 in 2008 (AHRIM, 2009). This growth has brought drastic changes to the economic and social structures of the country which was supported by the direct and indirect impact of tourism on job creation, foreign exchange earning and economic growth. The community is one of the main pillars of sustainable tourism development and knowledge about the perceptions of the residents is important in the success of the tourism industry, yet little is known about the local community perceptions of tourism in Mauritius.

The paper remainder is organised as follows. The next section reviews the relevant literature on tourism development and its benefits on host community. The research methodology is then presented followed by the results and discussion. Finally the conclusion and limitations of the study are presented.

LITERATURE REVIEW

Tourism has contributed to the domestic economies in many parts of the world. It is considered as an export industry (Law, 1992) even though the consumers must come to the destination for consumption (Debbage and Daniels, 1998). Local communities use tourism as an export to attract foreign exchange and accomplish other economic goals such as generation of wealth, employment creation and improvement of living standards. Tourists may be directly or indirectly be involved with the host community. The literature has revealed numerous studies on hosts' community perceptions of tourism development and identified host community perceptions in four dimensions: economic (Pizam, 1978; Belisle and Hoy, 1980; Liu and Var, 1986), social (Pizam, 1978; Perdue, Long and Allen, 1987; King *et al.*, 1993), environmental (Pizam, 1978; Liu and Var, 1986) and cultural (Liu and Var, 1986; Gilbert and Clark, 1997). Byrd and Gustke (2004) found that perceived impact was one of the main predictors for stakeholder support for sustainable tourism development in their community. Therefore, a clear understanding of the attitudes and interests of the host community is a necessary precursor to the planning and management of sustainable tourism.

Tourism Development

Recognizing the role stakeholders have in the tourism development process, numerous studies have explored attitudes and perceptions of individual stakeholder groups in the hopes of better understanding them (Long *et al.*, 1990; Jurowski, Uysal, and Williams, 1997; Brunt and Courtney, 1999; Andereck and Vogt, 2000; Pizam, Uriely, and Reichel, 2000; Gursoy *et al.*, 2002; Andriotis and Vaughan, 2003; Weaver and Lawton, 2004; Wickens, 2004; Cottrell, Van der Duim, Ankersmid, and Kelder, 2004; Poria, Reichel and Biran, 2006). Several studies have examined the perceptions of the host community toward tourism development and the literature shows that perceptions of residents differ toward tourism development. A larger number of studies have demonstrated that residents who are dependent on the tourism industry or perceive a greater level of economic gain are likely to have a more positive perception of the economic impact of tourism than other residents (Lankford and Howard, 1994; Jurowski *et al.*, 1997; Sirakaya, Teye and Sönmez, 2002). Economic benefits are the most important elements sought by local residents from tourism development (Ritchie, 1988; Husband, 1989; Akis *et al.*, 1996). Economic benefits include increased investment and tax revenues and improved standard of living. Tourism is a way to create employment where options are restricted (Fainstein and Gladstone, 1999). Lindberg and Johnson (1997) reported that people who placed a greater amount of importance on economic development had more positive attitudes toward tourism.

The impacts of tourism consist not only of the economic aspect such as employment creation and generation of wealth, but also of a socio-cultural and environmental component. The socio-cultural benefits include modernization and exchange among cultures, social change, enhanced image of host community, improved public health, social and amenity improvements, education and conservation (Travis, 1984). Other studies have also found that tourism should also improve the standard of living of the residents (Liu, 2003). Social impact has been recognized as support for tourism development within host communities and fundamental precondition for a sustainable industry (Ap and Crompton, 1998; Gursoy *et al.*, 2002; Teye *et al.*, 2002; Andriotis and Vaughan, 2003; Jurowski and Gursoy, 2004; McGehee and Andereck, 2004; Nyaupane and Thapa, 2006; Zhang *et al.*, 2006). Liu (2003) adds that sustainable tourism should meet the needs of the local population's standard of living over the short and long terms. According to Allen *et al.* (1993), residents agreed that their community should attract more tourists because this would lead to a higher quality of life.

The environment in the tourism context includes the physical environment to include wildlife, the farmed environment, built environments, and natural resources (Swarbrooke, 1999). Environmental benefits are also important and consist of improved infrastructure and enhanced recreational facilities. Hence the perceived benefits of tourism consist of several pillars and tourism development should protect local and national culture, improve social and individual well-being, and preserve the surrounding environment (Choi and Sirakaya, 2005).

RESEARCH METHODOLOGY

A questionnaire was developed following a review of existing literature on residents' attitude toward tourism development (Long, Perdue and Allen, 1990; Perdue *et al.*, 1990, Johnson, Snepenger and Akis, 1994; McCool and Martin, 1994; Lankford and Howard 1994, Madrigal, 1995; Akis, Peristianis and Warner, 1996; Ap and Crompton, 1998, Choi and Sirakaya, 2005). The questionnaire comprised of 24 items and respondents were requested to demonstrate their perceptions toward the role tourism played in their community by rating their level of agreement with each statement on a five-point Likert scale from strongly disagree (1) to strongly agree (5). In addition, two statements, adopted from Andereck and Vogt (2000), were used in the analysis were designed to assess the host's perceptions of overall directions of future tourism development options within the island. An open-ended question was included which dealt with the greatest contribution of tourism in the host community area. Demographic characteristics of age, gender, level of education, years of service and monthly household income were also captured in the questionnaire. A pilot test was conducted on the questionnaire to ensure its clarity, reliability and comprehensives. Twenty questionnaires were distributed to the local community residing in the coastal region. Some modifications to the wording were made as a result of the pilot test. In addition, a reliability analysis was used to test the reliability of the 24 items. The reliability analysis revealed that the alpha coefficient was 0.78, which exceeds the minimum coefficient (0.5) suggested by Nunnally and Bernstein (1994).

The sampling frame focused on locals living in the northern region as this area displayed extensive tourism development. The sample size was 500 valid surveys, with a sample error of 5 percent and a confidence level of 95 percent in the worst-case scenario. The questionnaire was distributed door-to-door in the Northern coast of the island and if an individual refused to participate, the next household was intercepted and asked to participate. The survey was carried out in the period of March-May 2009. The Northern coast was selected because of increased tourism development in this region. The community does not only rely on fishing and agriculture as the North coast is an important tourist destination where numerous hotels, bungalows, restaurants, pubs, shops and other tourist amenities dominate the region. Data analysis was carried out by using descriptive statistics such as mean, standard deviation and t-test. An exploratory factor analysis was performed to reduce the number of host community attributes to a few correlated dimensions and the VARIMAX rotation methodology was used. A multiple regression analysis was conducted on the data to explore the impact of future tourism development on each dimension derived from the factor analysis.

RESULTS AND DISCUSSION

The majority of respondents were young (56.4% were less than 37 years old). There was a roughly even distribution of men and women with 49.2% for men and 50.8% for women, respectively. Most of the respondents were married (57.2%), while 43% were still single. The incomes of the household surveyed reported from \$500 to \$1500 (48%). Most of the respondents have been working in the tourism industry for more than 10 years (65%). With regard to educational background, 23.4% had a university degree, 29.6% of the respondents were diploma holders, while 47% attained secondary school level.

Validation of Scales

Respondents were requested to demonstrate their attitudes toward the role tourism played in their community by using the 5-point Likert-type scale for each statement. Factor analysis was conducted to assess the dimensionality of the 24 items. All exploratory factor analyses were initially performed using the principal axis factoring method and Varimax rotation with the Kaiser Normalization. The Bartlett test of sphericity was significant (Chi-square = 3005.04, $p < 0.000$). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was computed to quantify the degree of intercorrelations among the variables, and the results indicate an index of 0.755. Since the KMO measure of sampling adequacy was larger than 0.6, it showed that the use of factor analysis was appropriate. A cut-off factor loading of 0.5 and an eigenvalue greater than or equal to 1 were used (Hair *et al.*, 1998). The principal component analysis (with varimax rotation) of the 24 items resulted in a three-factor solution that explained 69.70% of the total variation. Each of the items loaded strongly on one of the three factors. Cronbach's internal consistency reliability is the most widely used reliability test methods. Nunnally and Bernstein (1994) recommended that a score of 0.7 or higher is desired reliability while 0.6 or higher is an acceptable reliability coefficient for research at the early stage of the scale development. Cronbach's alpha coefficients for the three factors ranged from 0.64 (lowest) to 0.89 (highest) with a total scale reliability of 0.78. This indicates that the variables exhibited a strong correlation with their factor grouping and thus were internally consistent.

Table 1 displays the items, factor loadings, eigenvalues, Cronbach's alpha and descriptive statistics. The first factor labeled 'socio-cultural benefits' explained 37.55% of the total variance with a reliability coefficient of 0.78 and mean of 3.82. This factor contained eight perception items including cultural activities and facilities and quality of life. The second factor named as 'economical benefits' accounted for 21.37% of the variance with a reliability coefficient of 0.89 and mean of 3.66. This factor comprised eight items such as tax revenues, employment, income, and investment/business. The third factor, 'environmental impacts' explained 10.78% of the total variance with a reliability coefficient of 0.64 and mean of 3.84. This factor incorporated eight items related to improvement of roads and other public services, urbanization and better quality of buildings and city planning. Furthermore, the mean value of each factor was examined in this study to examine the overall hosts' attitudes toward tourism.

Table 1 shows that the host community tends to agree that tourism has a positive impact on community development in the island. As indicated in Table 1, the mean value of factor 1 is 3.82 (SD = 0.72), the mean value of factor 2 is 3.66 (SD = 0.65) and the mean value of factor 3 is 3.84 (SD = 0.87). The results indicate that overall, hosts are generally favorable to tourism and demonstrate substantial support for tourism development in their community. The results of the study demonstrate that at a community level there is a strong support for tourism development, particularly due to its economic benefits. The host community perceived that tourism development helps to enhance community life with items such as availability of entertainment facilities in the area and variety of cultural activities in the community.

The host community also perceived that the industry has a positive influence on the community's economy as a result of economic diversity, job creation, and tax revenue. The community felt that tourism can help improve the local environment which included items such as preservation of natural and cultural resources, and beauty of the island. They felt tourism has a positive influence on community services offered, including items such as improvements of roads and public services. The results of t-tests ($p < 0.01$) carried out for each item separately across the three factors, suggest that host community positively perceived tourism development in their community in relation to creation of more jobs, attracting more investment to the community, providing more business for local people, creating additional tax revenue, resulting in more cultural exchange between tourists and residents, creating positive impacts on the cultural activities of the community, providing more recreational and sport areas for local residents, and maintaining high standards of roads and public facilities. The host community believed that social and cultural life in the Northern coast has improved. Andriotis and Vaughan (2003) contend that hosts'

perceptions and acceptance of tourism development is considered important to the industry's long-term success. The results indicate that when the host community perceives an increase in job creation, shopping and dining choices, along with more tourism activities associated with arts and cultural and environmental features, the more likely the residents are to observe tourism positively. The support of the host community for tourism development reveals that there is higher likelihood for the tourism industry to succeed.

Table 1: Impacts of Tourism on Host Community

Statements	Factor Loading	Eigenvalue	Mean	SD	t-value
Socio-Cultural Impacts ($\alpha = 0.78$)					
Tourism encourages a variety of cultural activities by local population, e.g., crafts, arts, music		5.56	3.82	0.72	90.20
There is understanding of different people and cultures by residents	0.575		3.67	1.32	50.82
Tourism has increased local awareness and recognition of the local culture and heritage	0.596		3.56	1.19	54.74
Tourism has provided opportunities to restore and protect historical structures	0.649		3.86	1.16	60.73
There is a change in life style that occurs because of tourism development	0.667		3.80	1.31	52.97
There is a variety of shopping choices in the community	0.538		3.89	1.20	59.34
There is a variety of entertainment facilities in the area	0.662		3.98	1.32	41.10
Tourism development leads to a variety of restaurants in the area	0.630		3.98	1.44	37.75
	0.577		3.78	1.49	46.36
Economic Impacts ($\alpha = 0.89$)					
		2.32	3.66	0.65	72.61
The number of jobs in the community has increased due to tourism development	0.666		4.03	1.12	65.56
The personal income of local residents has increased due to tourism development	0.621		3.61	1.12	58.68
The standard of living of the host has increased because of tourism development	0.577		4.14	1.00	75.76
Tourism generates substantial tax revenues in the host economy	0.666		3.56	1.00	64.86
Tourism development leads to a high level of investment, development and infrastructure spending	0.735		3.44	1.14	55.22
Tourism development improves the quality of local services	0.702		3.60	1.29	51.01
Tourism creates new markets for the local products	0.621		3.38	1.47	41.82
There is a variety of shopping facilities in the area	0.749		3.49	1.59	40.18
Environmental Impacts ($\alpha = 0.64$)					
		1.76	3.84	0.87	67.70
The quality of natural environment is enhanced due to tourism development	0.681		3.23	1.45	40.77
There is improvement of roads and other public services	0.662		3.99	1.41	38.79
Host community benefits from recreation and sport facilities	0.534		3.85	1.43	36.43
There is better quality of buildings and city planning	0.511		4.63	1.13	58.72
The level of urbanization has increased due to tourism development	0.612		3.70	1.40	35.31
Tourism must improve the environment for future generations	0.768		3.65	1.44	33.53
Tourism development should strengthen efforts for environmental conservation	0.705		3.92	1.49	35.87
Proper tourism development requires that wildlife and natural habitats be protected at all times	0.684		3.72	1.02	39.22

All t-values significant at $p < 0.01$ level; SD = standard deviation

Table 1 displays the factor loadings, eigenvalues, Cronbach's alpha and descriptive statistics for the items under evaluation.

Tourism Development

The host community was also asked to rate their support for future tourism development (Table 2). Their beliefs for encouraging tourism development were strong, with a mean score of 3.79 out of 5.0. The host community is favorable to tourism development in their community. To test the influence of tourism benefits on encouraging future tourism development, a regression analysis was conducted using 'future

directions’ as dependent variable and socio-cultural, economic and environmental impacts as independent variables as follows: Future tourism development = f (socio-cultural, economic, environmental impacts)

The results of the regression of the three host community impacts dimensions against the dependent variable of ‘future directions’ are presented in Table 2. In general, the model fit the data moderately well. The regression for “encouraging tourism development” indicated a good adjusted R² of 0.572. This indicated that 57% of the variation in “encouraging tourism development”. The F-ratio of 61.16 was significant (p < 0.000), indicating that the results could hardly have occurred by chance. The results indicated that all the three tourism impacts, namely socio-cultural, economic and environmental impacts had beta coefficients that were statistically significant (p ≤ 0.001). It is observed that there was a positive relationship between socio-cultural and economic impacts and the dependent variable “encouraging tourism development”; however a negative relationship is observed for environmental impacts on encouraging tourism development.

The findings of this study are similar with previous studies where the host community perceived greater level of economic gain and hence perceived the impact of tourism development to be positive. They especially felt that tourism has positive effects on the local economy, such as improving the economy and creating jobs, and they also agreed that tourism can result in a number of quality-of-life improvements. However, the study findings further showed that the host community has concern for the environment. Recognizing the seriousness of ecological problems, the community has become increasingly environmentally conscious. It could be that the host community is conscious of the possible drawbacks of hotel constructions at the detriment of lovely beaches. This result has been identified by previous studies (Liu and Var, 1986; Liu et al., 1987; Teye et al., 2002; Kuvan and Akan, 2005).

Table 2: Hosts’ perceptions for Further Tourism Development

<i>Dependent</i>	<i>Independent</i>	<i>b-value</i>	<i>Beta</i>	<i>t-value</i>
Encourage Tourism development in the community (mean = 3.79)	Socio-cultural Impacts	0.704	0.385	6.552*
	Economic Impacts	0.122	0.161	5.543*
	Environmental Impacts	- 0.247	- 0.237	- 2.255**
R ² = 0.574; F = 61.16; *p < 0.001; ** p < 0.05				

Table 2 shows the regression results measuring the dependent variable “encouraging tourism development” on the tourism impacts

CONCLUSIONS

This study was initiated to investigate the hosts’ community attitudes on the northern coast of the island on various relevant tourism impact items and assess their influence on future tourism development in Mauritius. The impact items covered in the study were related to social-cultural, economic and environmental aspects. Overall, the host community was positively inclined toward tourism and its development as the community possesses positive attitudes toward socio-cultural and economic benefits, clearly expecting that the Northern coast tourism industry would result in an overall better quality of life. In other words, the more benefits the host community perceived obtaining from tourism, the more likely they are to increase the support for tourism development and the more likely they are to attribute the improvement of their community to tourism development. However, the community has concern regarding the environmental impacts for future tourism development. The findings are in accordance with Liu and Var (1986) and other studies that have shown that respondents, to some overwhelming extent, are satisfied with tourism development. Understanding hosts’ attitudes can help destination developers and policy makers better assess the host community’s perceptions of tourism development.

The scales adopted for this study using factor analysis resulted in domains similar to those discovered previous studies. It is encouraging to see residents are aware of the many benefits of the social, cultural, and economic benefit of tourism while at the same time understand that it can have detrimental effects on

the environment of the destination community. The community enjoys the economic benefits that accrue from tourism. The findings reveal that the revenues brought by tourism development are not only reaped by the government but the benefits seem to have trickled down among members of the host community.

Limitations of Study

There are some limitations to the findings of this study that need to be acknowledged. First, the data sets available in this study were limited to only the Northern coast of the island, the results may not be generalized to other coastal regions toward tourism development. Therefore, it is possible that the resident reactions found in this study toward tourism development would be biased. Further study could be extended to the new development in the western coast and also the other coastal regions. Secondly, it may be useful to extend this research by conducting surveys on residents’ individual characteristics such as age, gender and occupation in an attempt to identify whether differences and similarities exist that may lead to the proposition that there are common characteristics among residents to tourism development. In addition, the costs of socio-cultural, economic and environmental aspects were not presented in this study. For example, the respondents’ attitude to tourism development in general would influence their reactions to future tourism development. This kind of information would assist the tourism planners in developing a policy for sustaining tourism development and aligning future growth and tourists’ interests with the hosts’ desires. Incorporating these forces in future studies would be beneficial and contribute to the tourism impact literature in small island developing state.

APPENDIX

Questionnaire

Tourism Development Impacts Statements	How would you rate the impacts for the attributes given in the column, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neither disagree nor agree, 4 = Agree, 5 = Strongly Agree				
Tourism encourages a variety of cultural activities by local population, e.g., crafts, arts, music	1	2	3	4	5
There is understanding of different people and cultures by residents	1	2	3	4	5
Tourism has increased local awareness and recognition of the local culture and heritage	1	2	3	4	5
Tourism has provided opportunities to restore and protect historical structures	1	2	3	4	5
There is a change in life style that occurs because of tourism development	1	2	3	4	5
There is a variety of shopping choices in the community	1	2	3	4	5
There is a variety of entertainment facilities in the area	1	2	3	4	5
Tourism development leads to a variety of restaurants in the area	1	2	3	4	5
The number of jobs in the community has increased due to tourism development	1	2	3	4	5
The personal income of local residents has increased due to tourism development	1	2	3	4	5
The standard of living of the host has increased because of tourism development	1	2	3	4	5
Tourism generates substantial tax revenues in the host economy	1	2	3	4	5
Tourism development leads to a high level of investment, development and infrastructure spending	1	2	3	4	5
Tourism development improves the quality of local services	1	2	3	4	5
Tourism creates new markets for the local products	1	2	3	4	5
There is a variety of shopping facilities in the area	1	2	3	4	5
The quality of natural environment is enhanced due to tourism development	1	2	3	4	5
There is improvement of roads and other public services	1	2	3	4	5
Host community benefits from recreation and sport facilities	1	2	3	4	5
There is better quality of buildings and city planning	1	2	3	4	5
The level of urbanization has increased due to tourism development	1	2	3	4	5
Tourism must improve the environment for future generations	1	2	3	4	5
Tourism holds great promise in my community’s future	1	2	3	4	5
The tourism industry will continue to play a major role in this community	1	2	3	4	5

1. The following questions are about your perceptions of tourism in Mauritius. There are several statements about the economic, social and environmental impacts that can result from tourism. Please indicate whether you strongly disagree, disagree, neither disagree nor agree, agree, or strongly agree with the following statements. There are no right or wrong answers, so please give the answer which most closely expresses your perceptions.

II. The following questions relate to your demographic background. Please tick the appropriate box below.

1. Gender:

- Male Female

2. Marital Status:

- Single Married Divorced

3. Your age group:

- 18 – 25 36 – 45 55 +
 26 – 35 46 – 55

4. Highest level of education:

- School certificate Diploma
 Higher School certificate Degree
 Others (specify :.....)

5. How many years have you been working in the Tourism Industry?

- Less than 1 year 5 years < 10 years
 1 year < 5 years > 10 years

6. What is your monthly income range?

- Less than \$500
 \$500 – \$1000
 \$1000 – \$1500
 More than \$1500

III. What is the greatest contribution of tourism in the area that you are living in?

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ACKNOWLEDGEMENT

The authors would like to thank the editor and the anonymous reviewers for their constructive comments.

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THE ROLE OF CUSTOMER SATISFACTION IN THE QUALITY MANAGEMENT SYSTEMS: A CROSS-CULTURAL STUDY

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ABSTRACT

This paper aims at presenting the concept of customer satisfaction in the context of activities focused on quality management in the food industry enterprises in Poland and in the USA. The studies were conducted in food industry enterprises that possessed quality systems, certified according to ISO 9001:2000 standard. Author-investigated assessment of enterprises' activities in the area of customer satisfaction management indicate that American and Polish companies have similar perceptions of issues associated with measuring customer satisfaction. However, American companies have more knowledge of the theoretical concept of customer satisfaction, therefore they possess a greater understanding of the implications of customer satisfaction research.

JEL: L66, M11, M39, N62, N64

KEYWORDS: Customer satisfaction, quality management systems, food industry in Poland and the USA

INTRODUCTION

A wide range of marketing research studies have been conducted to investigate the concepts of service quality and customer satisfaction that can lead to the creation of sustainable competitive advantage. However, marketing literature does not consider the concepts of quality management and customer satisfaction as corresponding issues in manufacturing firms. This study presents the concept of customer satisfaction in the context of activities focused on quality management in food industry enterprises. The authors provided an assessment of organizational activities in the area of customer satisfaction management and conducted cross-cultural studies including enterprises in Poland and in the USA that possess quality systems, certified according to the ISO 9001:2000 standard.

The rationale for this study emerged from an analysis of current trends in quality management systems. Business organizations are aware that in order to improve their business performance they need to satisfy customer needs, and they need to deliver a high quality product. Many times companies decide to invest in quality management systems because they believe that this will guarantee success in delivering high quality products, and therefore customers will be satisfied. This is a valuable approach, however business organizations are focusing more on the technological standards of quality and tend to forget about their relationship with customers. They ignore the importance of customer satisfaction, believing that with a good product, satisfaction will follow.

In the US there are about 30,000 companies that are classified as food manufacturers, and about 1,100 possess ISO certification (www.usda.gov), whereas in Poland there are about 3,200 companies in this industry, and about 200 companies are certified (Institute of Organization and Management in Industry "Orgmasz," 2009). However, the ISO certification is becoming the worldwide-accepted quality standard, and in the case of the food industry, it is implemented by more than 430,000 organizations in 158 countries (www.iso.org). Importantly, these norms not only cover managerial and operational issues, but

also require that organizations conduct customer satisfaction studies. Because of that, there is a growing demand for increased research in the area that merges the concepts of quality management and customer satisfaction. This paper tries to eliminate this gap in literature because little research has been conducted to address the benefits of these two concepts as mutually supportive in the manufacturing industry.

This paper is organized as follows: literature review discusses issues of customer satisfaction and the importance of quality management systems. The next section describes research methodology. Finally discussion and conclusions are outlined.

LITERATURE REVIEW

Customer Satisfaction – The Notion and Its Core Issues

There are a number of discussions in marketing literature devoted to the effects of customer satisfaction on business performance. Many discussions in marketing literature support the importance of customer satisfaction on business performance and business success (Fornell 1992, Harting 1998, Zairii 2000, Bolton, Kannan and Bramlett 2000, Rampersad 2001, Gounaris and Stathakopoulos 2001, Anderson, Fornell and Mazvancheryl 2004). Therefore we should perceive satisfied customers as an enterprise's assets that carry strong economic meaning in the highly competitive environment. A variety of studies emphasize customer satisfaction as a necessary condition for customer retention and loyalty (Fornell 1992, Bolton 1998, Morgan and Strati 2000), that can help secure future revenues (Rust and Zahorik 1993, Scheuing, 1995; Reichheld, 1996; Helgesen, 2006,). Through delivering a high level of satisfaction, firms can decrease the costs of future transactions (Reichheld and Sasser 1990, Shneider 2000), decrease price sensitivity (Anderson 1996, Shneider 2000) and complaint behavior (Fornell 1992, Bolton 1998, Barlow and Moller 1996). The literature also presents multiple positive effects of customer satisfaction on improvement of brand image (Lawson and Glowa 2000), company reputation and positive recommendations (Anderson and Sullivan 1993, Zairi 2000, Anderson, Fornell and Mazvancheryl 2004), employee motivation (Muffatto and Panizzolo, 1995, Naumann and Hoisington 2001) and identification of improvement areas (Pasquier and Fastnacht, 2001).

Constant need for communication with the customer and the ability to listen to their opinions about products or services is becoming a very important issue. It is the customer who decides which product or service offering represents the highest value. Customers' decisions determine the future of the organization. A manufacturer or service provider is forced to provide the customer with the information that he/she demands to satisfy expectations and fulfill customer needs. The concept of marketing orientation assumes that determining the needs and demands of target markets as well as supplying the demanded level of satisfaction to customers more efficiently than competitors is the key to achievement of enterprise goals (Sudol, Szymczak and Haffer 2000). This is a trend that shifts strategic behavior of enterprises by limiting strategies of increasing market share and switching to strategies of increasing customer satisfaction (Fornell 1995). Numerous quality management systems can be helpful to achieve this state because knowledge about the customer and his/her needs is becoming necessary to develop and implement the efficient quality program of every enterprise. Customer satisfaction measurements that function as a specific type of early warning system for management could be seen as an activity that serves that goal. Sales level and profits generated by the enterprise can be seen as the ultimate measure of future activity results, while customer satisfaction measures can indicate the future customers' behavior and, as a consequence, what results the enterprise can expect.

Kotler (1994) defines customer satisfaction as the situation experienced by an individual and related to comparison of perceived characteristics of products and expectations of that individual concerning those characteristics. According to Zeithaml and Bitner (2000) it is the product or service evaluation in terms of whether that product or service has met customers' needs and expectations. This approach utilizes a

disconfirmation paradigm (Oliver 1995), which states that satisfaction is believed to occur through the process of matching expectations and perceived performance. Woodruff and Gardial (1996) define satisfaction as a positive or negative feeling of the customer related to the value received as a result of choosing a specific product offer in a specific situation. That feeling can be attributed to the direct reaction to overall experiences associated with a product or company. In defining customer satisfaction the emotional aspect of it is highlighted by defining satisfaction as a mental state, which is the emotion expressing satisfaction or dissatisfaction with the choice made in the act of purchasing (Otto 1999).

Still other authors focus on the aspect of valuation and assessment of the product or service acquired (Westbrook and Oliver 1991). In other words, it is the comparison of the expected product quality, perceived product quality and the importance of its different characteristics. Schneider (2000) suggests that customer satisfaction can be treated as the result of the psychological process in which the customer compares the perceptible level of enterprise operation (the existing quality) with already established standards that generally represent his expectations (the expected quality). Therefore, the latter two definitions stress the importance of the connection between satisfaction and quality. All cited above definitions suggest that the appearance of satisfaction should be understood as a dynamic process where assessment of the consumption experience in the category of satisfaction is done within the framework of the continuum from undesired lack of satisfaction to the desired satisfaction. It should be remembered that the appearance of satisfaction is a relative state, not an absolute and permanent one (Zairii 1996).

There are two generally accepted major concepts of customer satisfaction, i.e. the *transaction-specific satisfaction* and *cumulative satisfaction* (Jachnis and Terelak 2002), which were suggested in the definition by Woodruff and Gardial (1996). The first highlights the shortness of consumer experience with the product or service (from transaction to transaction) and deals with the cognitive dissonance related to the transaction experience and consequences of product purchase. However, that assessment does not include the personal “historical” experience of the buyer. The second approach focuses on accrual of customer experience related to the object of purchase or overall experience with a particular company. As a consequence, satisfaction is not a passing and short-term state of contentment but it represents comprehensive assessment of consumption over a specific time. That concept is consistent with the approach presented in the economy combining satisfaction with the ability to assess the usefulness of the product acquired.

Customer Satisfaction and Quality

The link between quality and customer satisfaction is often presented only as a result of each other. Most of the studies of consumer satisfaction highlight the unavoidable relationship between customer satisfaction and quality. Sureshchander, Rajendran, and Anantharaman (2002) argued that an increase in one is likely to increase the other, therefore service quality and customer satisfaction are closely related. Others (Ranaweera and Neely 2003) also report that service quality is often positioned as an antecedent of customer satisfaction. Even contemporary definitions of quality frequently refer directly to customer satisfaction. The American Society for Quality (www.ASQ.org) distinguishes two meanings: “(1) the characteristics of a product or service that bear on its ability to satisfy stated or implied needs; (2) a product or service free of deficiencies.” Therefore, it is apparent that satisfying customer needs is an integral part of delivering quality along with conformance to requirements. Anderson, Fornell and Rust (1997) define quality that meets customer needs as a design characteristic of the product (attributes and features) as well as the way in which service is delivered. Some countries (Japan, Sweden, and United States) raise the issue of quality and customer satisfaction to the rank of the social issue where they developed national level economic metrics of Customer Satisfaction as a measure of quality (Fornell 1992). The importance of this relationship is included in the regulations of the International Organization for Standardization regarding quality (ISO 9000). Currently these standards are strongly influenced by customer satisfaction, whereas formerly they were mainly based on norms (Muffato and Panizzolo 1995).

ISO series 9000:2000 standard even provides the definition of customer satisfaction. It is customer contentment, and customer perception concerning the level to which his expectations have been satisfied. It also states that customer complaints represent the common indicator of its low level. On the other hand it is pointed out that the absence of complaints is not equivalent to high customer satisfaction level. ISO 9001:2000 standard indicates also one more aspect - treatment of customer satisfaction as one of the measures of quality management system performance. Quality awards such as the European Quality Award and the Malcolm Baldrige Award treat customer satisfaction as one of the most important areas in an organization during assessment of quality focused management systems.

Enterprises that are currently on the path of quality improvement processes and have certified quality systems compliant with the ISO 9001:2000 standard are required to conduct customer satisfaction studies. The new standard pays special attention to the customer focus of the enterprise. Quality systems are becoming necessary tools supporting implementation of quality tasks in the enterprises striving to satisfy the customer (Lock 2002). The ISO 9000 revision requires firms to develop processes that are both effective and efficient for generating, analyzing, and applying customer satisfaction information in order to improve organizational performance (Bond and Fink 2003). To attain true customer satisfaction the companies need to achieve quality not only by eliminating the causes for direct complaints but also by providing their products with an excellent, attractive quality – to delight to the customer (Fecikova 2004).

To understand customer satisfaction, everyone within the organization should consider continuous improvement as something normal (Rampersad 2001). Results of studies carried out by many researchers (Moore, Hopkins and Hopkins 1998, Bowles 1992, Grant, Shani and Krishan 1994, Steeples 1992) provide strong support for the notion that quality improvement is a method of achieving customer satisfaction. Recent changes in ISO embrace customer satisfaction as a focus of the standard and require certified companies to collect and analyze customer satisfaction data (Bond and Fink 2003).

Another approach that explains creation and connection between customer satisfaction and quality is the PROSAT model (Schneider 2000). It is a multidimensional model that suggests that customer satisfaction can be seen as twofold: as a real value delivered by the firm and subjective customer' expectations. This model is theoretically rooted in the Parasuraman's Model of Service Quality (1985).

According to the PROSAT these are the following dimensions that influence development of Customer Satisfaction: 1) Technical product quality – conformation to specification requirements, safety, sustainability, environmental safety. 2) Quality of reputation – customer's perception about company and product/service that is based on his/her subjective benchmarking of competing companies, their competencies, brands and reputation. 3) Price perception – list price, discounts, sales promotions, perceived value. 4) Quality of interpersonal relationship – communication styles, empathy, complaints handling. 5) Service quality – sales personnel competency, immediacy of response, safety, tangible components of service (sales personnel appearance, atmospherics, equipment and promotional materials).

It is clear that customer experience is shaped before, during and after sale. Therefore, satisfaction is created not only by the objective product or service quality, but also through the process of customer perception. It is also important to understand the relationship between price and product value as a critical determinant of the purchase. It is the customer who is deciding if the product is worth the asking price. There is also another benefit of this situation. By enhancing perceived service quality to consumers, the company is able to increase the perceived costs of switching from one service firm to another (Meng, Elliott 2003).

From the other side of this model there are comparison standards - customer expectations. They can be grouped into three categories (Schneider 2000): (1) customer's experience, (2) other users experience (recommendations, word-of mouth), and (3) experiences shaped by the company's outside

communication (i.e. advertising). The third category suggests that the company itself can create a lack of satisfaction or cause dissatisfaction in extreme situations. Many times companies promise features and a level of quality that they cannot deliver; therefore they are shaping unrealistic customer expectations.

The PROSAT Model presents the concept of customer satisfaction creation that is the result of a mutual relationship between organization and buyer. It is possible to achieve this state only when communication between both parties occurs. Firms should know (through market intelligence) what the customer's needs and expectations are in order to deliver expected quality. Customers should be able to anticipate what level of quality the company is able to deliver at the accepted price, and therefore set the level of expectations. Quality is currently one of the major factors satisfying the customer.

This understanding of quality found its expression in the concept of Total Quality Management (TQM) where the management system is focused on obtaining optimal quality. The quality management systems are part of the system for management in an organization that is focused on quality goals that satisfy the needs and expectations of the customer adequately. Quality goals are additional to other goals of the organization such as those concerning development, financing, profitability, environment, safety and hygiene of work. Different parts of the organization management system can be integrated with the quality management system into a single system using common components. This could facilitate planning, allocation of resources, defining the supplementary objectives and assessment of overall organizational effectiveness. The organization management systems are usually assessed against their own requirements and against the requirements of standards, i.e. ISO 9001:2000. Provisions of that standard also make it possible for the organization to adjust its quality management system to the applicable requirements of another management system or integration of those systems.

Firms make significant investments in quality programs with the hope of generating huge increases in profitability (Douglas and Erwin 2000). Return on investments in the processes of delivering high quality (implementation of quality management system) can be seen through increased sales (Bank 1996). The more the quality improves, the faster the sales increase, because satisfied customers buy more (Morgan et al. 2000). Similar relations are reported by Woodruff and Gardial (1996). However, some researchers (Urbanek 2004) advise that quality understood traditionally as a group of characteristics consistent with defined specifications could not be identified with the level of customer satisfaction because high product quality does not automatically mean that the customer will be satisfied.

The ISO 9001:2000 standard also indicates one more aspect - treatment of customer satisfaction as one of the measures of quality management system performance. Customer satisfaction measurements investigate, among other goals, customer expectations concerning the characteristics of a given product or service. That means it should investigate the customer satisfaction attributes.

Quality Management Systems in Poland and in The USA

Quality management systems compliant with the ISO standard are broadly applied in Polish food enterprises, which presents a different situation in comparison to food enterprises in the USA. The accession of Poland to the European Union did not cause a significant increase in the number of enterprises that implemented the Quality Management System according to ISO, although the number of enterprises that obtained certificates for the Integrated Quality Management System (ISO 9000 integrated with the HACCP system) and other systems (the IFS and/or BRC) increased (Morkis 2005).

Adjustment processes in the Polish food sector in the area of product safety and quality improvement resulted in an increased share of exports in food industry sales from 13.7% in 2003 to 18% in 2005 and the increasing positive balance of trade in agricultural-food products. Increased production and sales, particularly exports, resulted in a significant improvement of results in the financial standing of the food

industry, which is a beneficiary of integration with the EU (Urban 2006). Programs aiming at development of quality orientation (like TQM) in organizations are currently implemented in Poland to an increasing extent. Practice shows, however, that implementation of the ISO standard or basics of quality management, through implementation of the TQM, does not always bring the expected results in the form of increased sales of products or services.

In the United States ISO norms are not widely implemented in the food industry. Quality certifications using the ISO standards are very popular in heavy industry, electric, and technical industries, where all management and manufacturing processes are well controlled. In the food industry quality control measurements are focused on food safety rather than the quality of the processes. One of the most often used standards is Safe Quality Food (SQF). It is a quality program recognized by the Global Food Safety Initiative (GFSI), an organization representing over 70% of food retail revenue worldwide and is managed by the Food Marketing Institute. Currently, there are two SQF Codes: SQF 1000 for farmers/producers and SQF 2000 for food manufacturers and distributors. SQF 1000 and 2000 Codes are based on the principles of Hazard Analysis at Critical Control Point (HACCP), Codex, ISO and Quality Management Systems. So, there is already some level of implementation of the ISO standards. However companies in the USA do not go through the certification process, because of the additional costs associated with certification and a bureaucratic overload that they perceive will accompany ISO certification. SQF Certification gives assurance to retailers that the food from suppliers has been produced, prepared and handled according to internationally recognized standards.

RESEARCH METHODOLOGY

Recently, the dynamic increase in the number of enterprises implementing quality management systems compliant with the ISO 9001:2000 standard has contributed to a significant proliferation of customer satisfaction studies. As a result of well-programmed customer satisfaction studies, management could obtain information on what characteristics of product or service customers are willing to pay for and what characteristics are less important to them. All in all, the revenues depend on whether we succeed in an accurate determination of customer expectations and whether we succeed in satisfying them better than the competitors do. The scope of this study covers analysis of the current status of the advancement of the customer satisfaction process management in Polish and American food sector enterprises possessing quality management systems certified in compliance with the ISO 9001:2000 norm. The study also looks at assessment of what possible activities for quality improvement would have the strongest influence on increasing revenues, and which would carry the relatively weaker effects.

The list of investigated organizations was obtained from the National Register of Quality Systems Certificates in Poland and Independent Association of Accredited Registrars in the USA. On that basis, 197 (Poland) and 27 (USA) food industry enterprises possessing certified quality systems were selected and qualified for the studies. The criteria for target selection were as follows:

1. Operation in the food sector
2. Possession of a certified quality management system

The study questionnaires were sent to all selected organizations. Not all the identified food industry enterprises joined the study. Some of them have already lost the validity of the quality system certificate (10% of enterprises covered); some enterprises were in the state of bankruptcy (3% of enterprises covered). Some organizations have liquidated their business (8% of enterprises covered) or simply did not respond to the questionnaire (49% of enterprises covered). As a result we used collected data from 60 enterprises in Poland representing 30% of the identified group of 197 organizations willing to participate in the study, and 19 enterprises (70% of identified organizations) in the USA. Questionnaires were distributed to all enterprises, so the return of questionnaires was treated as random selection of the

sample. Completed questionnaires were returned by 60 (Poland) and 19 (USA) enterprises, so it was decided to verify whether the sample of that size was sufficient to draw conclusions on the tested population of food industry enterprises. Characteristics of the sample populations are included in Table 1.

Table 1: Characteristics of the Investigated Organizations

	Poland	USA
Overall sample size (N)	60	19
Carried customer satisfaction measurements	53	18
Intent to measure CS in the future	5	1
Size of organization	medium and large	medium and large
Market	national/regional/ international	national/regional/ international
Participated in the study	55	19

This table shows the characteristics of the investigated firms that include number of overall sample, number of organizations that have been conducting customer satisfaction measurements, size of organizations and scope of operations.

The study has been conducted using the questionnaire that was distributed and returned by mail (Poland) and internet (USA) using the provided website that displayed the questionnaire. Surveys were completed by managers responsible for quality systems in the participating enterprises. The study covered the following issues: activities adjusting the enterprises to market economy conditions; reasons for customer satisfaction measurement; customer satisfaction measurement methods; objectives of customer satisfaction measurements; organizational units responsible for conducting customer satisfaction measurements; procedures for assessment of the customer satisfaction measurement system; purpose for which customer satisfaction measurement results are used; importance of customer satisfaction measurement according to the enterprise; barriers to customer satisfaction measurement.

The study also included assessment of the status of progress of individual activities in the area of customer satisfaction management in the investigated enterprises according to a scale from 0 to 5 where: 5 – the activity is present at very high level; and 0 – lack of activity at all.

DISCUSSION

As many as 88% of Polish and 89% of American participated enterprises declared that customer satisfaction measurement is done within the quality management system as an activity imposed by that system (mainly on the basis of the ISO 9001:2000 standard). That trend is also confirmed by studies conducted in 2001 on the group of 282 large and medium Swiss enterprises, which indicates that the main reason for conducting customer satisfaction studies is the requirement imposed by ISO series standard ISO (Pasquier and Fastnacht 2001). One of the issues investigated by this study was identification of customer satisfaction measurement methods that participating organizations currently apply (Table 2).

Obtained results indicate that the enterprises applied a number of customer satisfaction measurement methods simultaneously, which is consistent with the principles of accuracy in customer satisfaction measurement studies. Based on collected data, we observe that American companies implement more methods than Polish companies. Among companies in Poland the most frequently used methods are: “analysis of complaints,” “monitoring sales levels, market share or ROI” and “surveys” (94.5%, 87.3% and 76,4% of answers respectively). This situation could be explained by the fact that these methods are very easy to apply. Another explanation could be the fact that there is not much tradition in Poland conducting specialized measurements of customer satisfaction. American companies have operated for a much longer time familiar with the concept of customer satisfaction; therefore the number of methods (they indicated they are using) and their variety is greater than among Polish companies. However, among the top three the same methods are found with a small difference in order: “monitoring sales levels, market share or ROI,” “analysis of complaints” and “surveys” (84.2%, 78.9%, and 78.9% answers

respectively). There is one more indication that American companies are much more aware of the concept of customer satisfaction. Among investigated organizations, 14 out of 19 (73.7%) conducted dedicated and specialized “customer satisfaction research.” Comparing these results with the results from Polish organizations we can conclude that American organizations have much more expertise in tracking the level of customer satisfaction.

Table 2: Customer Satisfaction Measurement Methods

Methods of Customer Satisfaction Measurement	Poland		USA	
	Number of answers	%*	Number of answers	%*
Analysis of complaints	52	94.5	15	78.9
Monitoring sales levels, market share or ROI	48	87.3	16	84.2
Surveys	42	76.4	15	78.9
Benchmarking	33	60.0	8	42.1
Focus groups	23	41.8	9	47.4
Customer loss analysis	19	34.5	3	15.8
Telephone/personal interviews	11	20.0	7	36.8
Reports from first contact employees	10	18.2	4	21.1
Critical events technique	5	9.1	3	15.8
Studies on internal clients (employees)	4	7.3	2	10.5
Industry Reports	4	7.3	7	36.8
Customer Satisfaction Research	2	3.6	14	73.7
Other	-	-	-	-

*This table shows methods of customer satisfaction measurement implemented by investigated organizations in terms of the number and percentage of obtained answers. *Investigated enterprises could indicate more than one answer, as result the total could exceed 100 percent.*

We notice a significant difference between investigated groups of enterprises and the level of conducting customer satisfaction research as a separate method of tracking customer satisfaction: 3.6% and 73.7% in Polish and American enterprises respectively. Because of economic transformation in 1989, Polish business organizations had to quickly evolve and adjust their business activities to the “free” market economy. They did it successfully in a number of management and marketing areas. However, as obtained results indicate there are still issues that they had to address.

It is interesting that participating organizations in both countries indicated “analysis of complaints” as an important method of measuring customer satisfaction. This situation could be a direct result of implementation of ISO standards and adoption of the definition of customer satisfaction from these norms, where the level of complaints was directly associated with customer satisfaction. There is extensive literature on the subject of monitoring the level of complaints as a system of tracking changes in customer satisfaction, and it seems to be the appropriate action for these organizations, because consumer complaints are highly relevant sources of market information (Kasouf, Celuch and Strieter, 1995). They can provide organizations with an opportunity to learn from their mistakes, retain dissatisfied consumers, and influence consumer’s future attitudes and behavior (Powers and Bendall-Lyon, 2002; Estelami 1999).

The American Productivity and Quality Center (1999) assumes that an effective complaint management process can be an important quality improvement tool that is useful in making improvements that increase customer satisfaction. Effective responses to complaints can prevent a customer from switching brands or suppliers. This is important, since the cost of obtaining new customers is usually substantially greater than satisfying a current dissatisfied customer (Fornell and Wernerfelt 1987, Clark, Kaminski and Rink 1992).

Studies carried out by Nyer (2000) indicate that encouraging dissatisfied consumers to express their feelings and opinions may cause increased levels of satisfaction and product evaluation. Complainers tend to be more frequent users of the product and more affluent than a random sample of users. TARP (1979) studies reported that, even when complaints were not resolved satisfactorily, customers who complained experienced higher levels of repurchase intention compared to those who did not complain at all. Studies by Nyer (2000) showed that consumers who were encouraged to express their complaints were almost 59

percent more likely to purchase membership than consumers who were not asked to express themselves. A study of executives in 50 firms identified the process for handling customer complaints as a key driver of customer satisfaction (Mohr-Jackson 1998).

Customer satisfaction measurement in participating enterprises covers mainly the active buyers, followed by employees, potential customers, and intermediaries. Past studies (Fecikova 2004, Otto 2004) indicate that the satisfaction of internal customers (employees) is one of the basic conditions to satisfying the external – final customers on the market, therefore it is a good sign that in both groups of enterprises they do not neglect studying satisfaction of their employees.

In the majority of investigated Polish enterprises (64%), special positions within organizations have been charged with responsibilities of dealing with customer satisfaction measurement, while in the remaining (36%) enterprises there were no specially designated positions dedicated to customer satisfaction measurement. In American companies measurement of customer satisfaction has been conducted by employees in the marketing department as a part of the regular duties of these employees.

In Polish organizations the specialists responsible for customer satisfaction measurement have been various employees: specialists for marketing (55%), specialists for sales (12%), specialists for quality (9%) and other positions (24%). The literature points out numerous differences in perception of quality (influencing customer satisfaction) between employees dealing with marketing and employees directly involved in assuring product quality in the enterprise (i.e. engineers, operations and manufacturing managers) (Bond and Fink 2003, Woodruff 1997, Cravens et al.1988). Marketers define a product in terms of customer benefits (Kotler and Armstrong 1997), whereas quality managers define tangible attributes of the product that can be translated into specifications for a production process (Krishnan and Ulrich 2001).

As a result, marketers tend to avoid making commitments regarding products attributes too early in order to preserve adaptability in order to respond to changes in customer needs, while quality managers want to have manufacturing specifications as fast as possible. Success will depend largely on the willingness and ability of marketing managers to understand and collaborate with quality managers (Bond and Fink 2003). Empowerment is also an immensely important factor influencing customer satisfaction increases (More, Hopkins and Hopkins 1998, DuBrin 1997). Empowered employees use their judgment to take care of situations and solve customer-related problems so that customer satisfaction is created (More, Hopkins and Hopkins 1998). Only 30% of Polish enterprises covered by the survey reported that they estimate their customers' satisfaction level using only collected information from customers. The majority (61% of answers) declared that they know customers' satisfaction level from other sources (i.e. other market information), which are not part of the declared customer satisfaction measurements. These situations confirm that enterprises possess poorly developed methodological foundations of measurement and are unable to make full use of the results (as they do not have an internal, consistent customer satisfaction management system). Among American companies there is a higher level of understanding of the framework of measurements of customer satisfaction, and 63% of these organizations indicated that they know the level of customer satisfaction from reliable sources (methods, reports etc.).

Investigated organizations (over 90% of answers in both groups) described quality improvement as the most important objective in measurements of customer satisfaction (Table 3). Obtained answers indicate that investigated organizations are aware of the noticeable connection between the level of customer satisfaction and product quality. In both groups of enterprises the objective of "improving processes, production and products" has been pointed out as another important goal of conducting these measurements (73.7% - Polish, 78.9% American businesses). Interestingly, analysis of other responses suggests that Polish companies are seeing the potential of expanding customer satisfaction measurements

as a method of gaining customers' loyalty. This objective is rather ignored by American organizations (40.4% and 15.8% of answers in Polish and American companies respectively).

Table 3: Objective of Conducting Customer Satisfaction Measurement

Objectives	Poland		USA	
	Number of Answers	%	Number of Answers	%
Quality improvement	55	96.5	18	94.7
Improvements in products, production and processes	42	73.7	15	78.9
Gaining customers loyalty	23	40.4	3	15.8
Improving customer relationship	22	38.6	7	36.8
Improving customer service	19	33.3	4	21.1
Other	-	-	0	-
Total	161	-	47	-

*This table shows investigated organizations' objectives of conducting customer satisfaction measurements in terms of the number and percentage of obtained answers. *Investigated enterprises could indicate more than one answer, as result the total could exceed 100 percent.*

From the follow-up questions about the potential direct relationship between customer satisfaction and enterprise profitability, we draw the conclusion that they do not see these issues as directly connected. The majority of enterprises (over 60% of answers in both groups) report that they do not conduct studies on this relationship. It should be stressed that studies on that relationship are one of the main activities in the assessment of customer satisfaction measurement efficiency.

Investigated enterprises perceive customer satisfaction more as information about level of quality than as an indicator of overall business performance. In this study we also tried to identify areas where the results of customer satisfaction measurements have been utilized. We asked respondents to indicate how the collected data has been exploited (Table 4). The investigated enterprises considered the increase of product quality level and the identification of customer needs to be the most important of them (81.8% in Polish and 73.7% in American businesses). We did not observe a significant difference among the answers in both groups except in one area - the importance of conducting measurements of customer satisfaction as a means to improve customer loyalty, where American companies put much more importance on this item than Polish organizations (68.4% and 16.4% of answers respectively).

Table 4: Utilization of Results from Customer Satisfaction Measurements

	Poland		USA	
	Number of Answers	%	Number of Answers	%
Improving product quality	45	81.8	14	73.7
Identification of customer needs	38	69.1	16	84.2
Sales increase	33	60.1	10	52.6
Improvement in competitive position	22	40.0	8	42.1
Improvement in brand recognition/reputation	21	38.2	4	21.1
Costs reduction	10	18.2	5	26.3
Customer loyalty	9	16.4	8	42.1
Improvement in employee's quality of work	6	10.9	4	21.1
Other	-	-	0	-
Total	187	-	69	-

*This table shows how results obtained from customer satisfaction measurements have been utilized in terms of the number and percentage of obtained answers. *Investigated enterprises could indicate more than one answer, as result the total could exceed 100 percent.*

Because of the complexity of problems with customer satisfaction measurements, we also investigated the problems that might interfere with conducting these measurements. We asked a question about potential barriers and obstacles hindering customer satisfaction measurement (Table 5). Employees' resistance and fear of the consequences of a lack of customer satisfaction are the major barriers to customer satisfaction measurement in enterprises covered (47% of answers in both groups). In no case was lack of top management support for that type of activity indicated as an important obstacle. Interestingly employees

of American companies indicated that lack of knowledge of this issue was an important barrier, (63.2%) compared with Polish organizations (37%). Even based on collected data we could observe a much better understanding of the concept of customer satisfaction, as well as a number of methods and purposes where this concept is applied.

Investigated Polish enterprises declared that 75% of their customers are satisfied and 16% are highly satisfied. Among American organizations this was reported at the level of 79% and 15% respectively. Rampersad's studies (2001) indicate that results exceeding 75% of satisfied customers can be considered good results. As a consequence, the reported level of customer satisfaction in investigated organizations was relatively good although it represented the point of view of plenipotentiaries for quality systems and was not verified by direct opinions of customers. Furthermore, the intensity of customer satisfaction plays an important role. "Completely satisfied" customers are much more loyal than merely satisfied customers (Stauss and Neuhaus 1997). According to Urbanek (2004), in current times customers leave the company not because they are disappointed but because they are not highly satisfied and they have another option. Highly satisfied customers of Xerox were ready to purchase products of this company six times more often than customers who were just satisfied (Urbanek 2004). According to Harting (1997), however, an attempt at securing 100% satisfaction for all customers would be the path to inevitable bankruptcy, in particular when we deal with a large number of customers possessing highly diversified needs. Therefore, companies should always try to satisfy customers in the profitable way.

Table 5: Barriers that Obstruct Customer Satisfaction Measurement

Barriers to measuring customer satisfaction	Poland		USA	
	Number of answers	%	Number of answers	%
Employees' resistance (fear of consequences if low level of customer satisfaction is detected)	34	61.8	10	52.6
Employees' overload of daily activities/responsibilities	26	47.3	12	63.2
Lack of financial resources	24	43.6	9	47.4
Lack of knowledge of the issue	20	36.4	10	52.6
Lack of understanding that a complaint is valuable market information	8	14.5	5	26.3
Lack of interest in specific analysis of relations with customers	5	9.1	7	36.8
Lack of top management support	1	1.8	4	21.1
Other	-	-	-	-
Total	118	-	57	-

*This table shows barriers that obstruct customer satisfaction measurements in terms of the number and percentage of obtained answers. *Investigated enterprises could indicate more than one answer, as result the total could exceed 100 percent.*

The last area of this study was the assessment of actions that people responsible for quality management and customer satisfaction measurements take in the area of customer relations. We formulated statements addressing the status of involvement in activities linked to customers relating to problems of customer satisfaction (Table 6). We used a scale from 0 to 5, where 5 points meant that the activity is present to a very high extent, and 0 points meant that the given activity was absent.

We used t-test for independent variables, where we conducted statistical analysis of the means in two investigated groups. Computed statistics indicate significant differences between Polish and American companies in 18 out of 23 areas of customer relations. Interestingly, in the areas that have been ranked higher (spread 3.40 - 4.13), American companies are much more active than Polish organizations, however in the areas ranked lower (spread 1.58 - 3.31) we observed a reverse trend.

Table 6: Declaration of the Actions in the Area of Customer Relations

Statements	Poland $n_1=55$		USA $n_2=19$		t	p-value
	M	SD	M	SD		
1. We carefully listen to all comments from our customers	3.88	0.58	3.25	0.74	4.751***	0.000
2. We know our customers, their numbers and segments	3.77	0.53	4.01	0.44	-3.473***	0.003
3. We regularly update the data on our customers' needs and expectations	3.65	0.54	3.97	0.43	-2.742***	0.005
4. We treat every customer individually	3.58	0.72	3.70	0.52	-0.832	1.298
5. We foresee the needs of our customers	3.52	0.82	3.50	0.79	0.092	1.448
6. We treat complaints as a tool of communication with customers.	3.45	0.85	3.78	0.47	-2.945***	0.004
7. Complaints filed are systematically analyzed	3.45	0.83	3.75	1.13	-3.017***	0.003
8. We have established the database of our customers according to their needs	3.44	0.82	4.13	0.55	-6.899***	0.000
9. Customer Service Department works to solve customers' problems	3.42	1.19	3.8	0.65	-3.879***	0.002
10. More than 75% of our customers are satisfied	3.40	0.75	3.9	0.57	-4.571***	0.000
11. The procedure for filing and processing complaints has been developed	3.40	0.99	3.88	0.49	-3.941***	0.001
12. We measure satisfaction with our products/services among our customers	3.36	0.92	3.56	0.87	1.448	0.152
13. All employees are informed about customer satisfaction results	3.31	0.97	2.21	1.23	10.039***	0.000
14. Complaints are processed within one week at maximum	3.28	0.96	2.47	0.76	7.599***	0.000
15. The database of complaints is maintained	3.17	1.09	2.39	0.96	7.899***	0.000
16. We know the percentage of dissatisfied customers	3.07	0.89	2.22	0.67	9.146***	0.000
17. Products/services best fitting their needs are recommended to customers	3.02	1.10	2.00	1.17	9.923***	0.000
18. We maintain regular contacts with our customers	2.73	1.10	2.32	0.54	3.709***	0.000
19. Customer loyalty measurement is performed	2.59	1.16	2.42	1.06	1.389	0.142
20. Cost of gaining a new customer is known	2.46	1.13	2.50	1.23	-0.570	0.616
21. Volume of sales lost through dissatisfaction of customers is known	2.41	1.22	2.11	1.13	3.034***	0.002
22. Customer loss cost is known	2.34	1.04	1.74	1.07	5.856***	0.000
23. Regular meetings with groups of customers are organized to obtain knowledge concerning their needs	2.19	1.06	1.58	1.23	5.923***	0.000

*This table shows the results for t-test for independent variables, where $n_1=55$ and $n_2=19$. Respondent's answers are ranked on the scale from 0 to 5, where 0 described that the given activity was absent, and 5 meant that the activity is present to a very high extent. Significance levels are denoted *, **, *** for the 0.1, 0.05, and 0.01 respectively.*

The results show that Polish enterprises take an active role in the following dimensions: “listening to customers,” “knowledge about customers” and “updating information about customers” (means: 3.88, 3.77, 3.65 respectively). Among American organizations the dominant areas of involvement are: “maintaining contacts with customers,” “maintaining the database of customer needs,” “knowledge about customers” and “updating information about customers” (means: 4.21, 4.13, 4.01, 3.97 respectively). In both groups we observed some areas that scored far below 3 points, such as: “customer loyalty measurement” (mean = 2.59 and 2.56), “studies on costs of customer loss” (mean = 2.34 and 2.3), “studies on costs of gaining a new customer” (mean = 2.46 and 2.13) and “volume of sales lost as a

consequence of customer dissatisfaction” (mean = 2.41 and 2.56). Larger differences between enterprises can be observed, particularly in the case of statements where the average scores were low. Quality, customer satisfaction, value for the customer and customer loyalty are important links of the cause and effect chain of generating the enterprise financial result.

As indicated by studies conducted by Helgesen (2006), the more satisfied a consumer tends to be, the higher the loyalty of the customer, although the relationship between satisfaction and loyalty is not linear, and it is influenced by psychological and situational variables (Homburg and Giering 2001, Oliver 1999). While the relationship is positive, high levels of satisfaction do not always yield high levels of loyalty (Benett and Rundle-Thiele 2004). As a consequence, enterprises should not neglect conducting customer loyalty studies.

CONCLUSIONS

The purpose of this study was to present the concept of customer satisfaction in the context of activities focused on quality management in food industry enterprises in Poland and the USA. The empirical data has been gathered through surveys distributed among food industry enterprises certified with the ISO standards in Poland and in the USA. We believe that discussed findings provide important contributions to practice and research in this area. Due to constant changes in the market, companies are trying to improve their competitive position through the process of quality management. The path to improvement in this area leads through management of customer satisfaction.

Based on our findings we see that there are a number of similarities in the approaches of measuring customer satisfaction between organizations in the food industry in Poland and the USA. The important conclusion however, is that American companies are much more familiar with the theoretical concept of customer satisfaction and have a longer tradition in doing this.

The results of this study indicate that there are only small differences between Polish and American organizations in the food industry sector, especially in the perception of the importance of conducting measurements of customer satisfaction and the variety of methods employed. Based on the conducted study we can conclude that in both countries (Poland, USA), the majority of organizations conduct measurements of customer satisfaction as a requirement of the ISO 9001:2000 standard. Polish, as well as American companies, most often utilize a modest methodology for customer satisfaction measurements (sales level, analysis of complaints) because the data is readily available and does not require implementation of additional resources. However, American organizations seem to be more knowledgeable about the concept of customer satisfaction, therefore they also widely implement other methods (surveys, benchmarking, customer interviews and customer satisfaction research).

We can evaluate this as a positive direction, and we can observe that Polish enterprises are becoming aware of the benefits of more sophisticated methods. In the area of potential usage of the data generated by customer satisfaction research, we didn't observe a significant difference between Polish and American companies. In both investigated groups the increase in product quality and identification of customer needs have been declared the most important areas of data implementation. The focus on quality improvement is logical, although biased, because the surveys for this research have been distributed among employees whose primary responsibility is involvement in quality management in investigated companies. The indication of focusing on customer needs, however, suggests that investigated companies are seeing a link between the way they satisfy customer needs and the business performance of their organizations. As with any other research, this study has several limitations. The first limitation of this study is the size of the sample, particularly the sample size of the American companies.

The main obstacle that contributed to this state was difficulty in identification of the food industry enterprises that are certified according to the ISO standards. These standards are more often implemented by the enterprises in the construction and manufacturing industries. There are also a number of auditing units that award this certification, thus there is no single one registry that would include all certified enterprises. The second limitation is the fact that the study includes only organizations in one industry and therefore might not be representative of other sectors of the market. Therefore, future research could address these issues, particularly investigating the differences between industries and taking the cross-cultural approach to a different level.

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A LOG LINEAR ANALYSIS OF FACTORS AFFECTING PERFORMANCE OF EUROPEAN MANUFACTURING SMEs

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ABSTRACT

The purpose of this exploratory study is the examination of the complex interactions among variables that affect the performance of European manufacturing SMEs by using a hierarchical log linear model. In the present study, firm performance is empirically measured in terms of turnover growth. The raw data were drawn from an official survey conducted by European Commission's "Sectoral e-Business Watch" in 2007. This survey took place among SMEs from the 'Chemical, rubber and plastics', 'Steel' and 'Furniture' industries consisted of 1.716 telephone interviews with ICT decision-makers in seven selected EU countries (UK, France, Germany, Sweden, Spain, Italy and Poland). The seven variables, which take place in our study, concern employment of ICT practitioners, investments in ICTs, product-services innovations related to or enabled by ICTs, adoption of e-commerce and e-business activities, implementation of e-CRM and rivalry in the market. All these variables were found to be associated with the outcome variable firm performance in a chi-square test analysis. The results revealed seventeen out of an original twenty-eight possible two-way interrelationships between the chosen variables were identified as remaining in the hierarchical log linear model. This paper expands the research of factors affecting the firms' performance and allows a better understanding of the complex interactions and associations at multiple scales of manufacturing in Europe.

JEL: L25; L26; L6; M15

KEYWORDS: Firm performance, SME, ICT, manufacturing firms, hierarchical log linear analysis

INTRODUCTION

Within strategic management research there is a strong continuing emphasis on performance as a dependent variable (Eisenhardt and Zbaracki, 1992; Porter, 1980, 1985; Rumelt, 1974; Pettigrew et al., 2002; Schendel and Hofer, 1979). The selection of performance measures that reflect the true situation of small businesses with some degree of certainty and reliability is indeed a crucial process (Murphy et al., 1996). Researchers acknowledged that performance is a complex and multidimensional construct (Carton and Hofer, 2005; Dvir et al., 1993). Venkatraman and Ramanujam (1986) discussed organizational performance measurement in terms of organizational effectiveness, operational performance and financial performance. Financial performance measures allow for competitive analysis where firms compare financial data regarding market share, sales, production costs or the budgets of competitors (Yasin, 2002). The Report for the Enterprise Directorate of the UK Department of Business, Enterprise and Regularity Reform (2008) defined business performance both in terms of processes (start-up, resource acquisition, development and deployment (i.e., the strategic direction of the business) and outcomes (sales, profit, asset value, intrinsic work satisfactions). However, multiple performance indicators have been widely adopted by most researchers. Carton and Hofer (2006) revealed a total of 133 different measures of enterprise performance by reviewing empirical articles published from July 1996 to June 2001. In empirical studies, the choice of the performance measure is often limited by the availability of data.

In our model, business performance is measured in terms of turnover growth. Several studies (Barkham et al., 1996; Hoy et al., 1992) concluded that an analysis of a company's growth should, at least in part, be

based on changes in turnover because it reflects both short and long-term changes in the firm, is easily obtainable, and is a common performance indicator among entrepreneurs themselves. Our analysis is designed to capture the various factors that interact with turnover growth of European manufacturing SMEs. The research is based on an official survey conducted by European Commission's "Sectoral e-Business Watch" in 2007, which took place among SMEs from the 'Chemical, rubber and plastics', 'Steel' and 'Furniture' industries, consisted of 1716 telephone interviews with ICT decision makers in seven selected EU countries (UK, France, Germany, Sweden, Spain, Italy, and Poland). The paper focuses on proposing a hierarchical log linear model of seven factors influencing business performance. Specifically, the seven predictors which take place in our study, concern *employment of ICT practitioners, investments in ICTs, product-services innovations related to or enabled by ICTs, adoption of e-commerce and e-business activities, adoption of enterprise application system-CRM and rivalry in the market*. We included the last variable on the basis of business research plausibility.

While the univariate analysis identifies the relationship between the predictors and outcome, the hierarchical log linear model is a simply pragmatic approach based on the need to get a clear hierarchical picture and to uncover a web of complex interactions among the chosen variables. Numerous statistical methods have been utilized to generate predictive models that identify factors affecting performance of businesses. While these models provide an accurate statistical description between these variables and outcome, they are difficult to present the complex interactions visually. This study contributes toward this direction and it is an inspiring source for those who want to investigate systematically all orders of interactions of factors affecting the performance of European manufacturing firms. Additionally, the analysis strongly suggests that companies taking into account different factors can improve the chances to make better implementation of ICTs, and thus attain better levels of business performance.

The paper is organized as follows. First, an extensive review of the influential literature is presented. Secondly, we present a discussion of the methodological issues regarding survey development, sampling and data collection. Thirdly, the results of our research are followed not only by an analysis, but also by relevant interpretations. The last section contains a discussion on these findings as well as our conclusions, while a discussion on the limitations of our research and its implications for further future research is also included.

LITERATURE REVIEW

Background to the Small Firm Sector in the European Union

The EU has adopted a new categorization of SMEs since 2003, revising their earlier definition of 1996. According to this new definition, the basic prerequisite for an enterprise to be recognized as a small and medium one is to respect the limits regarding Staff headcount and financial ceilings (annual turnover or annual balance sheet). The new definition introduces three different categories of enterprises (micro, small and medium). Each corresponds to a different type of relationship which an enterprise might have with another. This distinction is necessary in order to establish a clear picture of an enterprise's economic situation and to exclude those that are not genuine SMEs. The definition categorizes SMEs as follows (European Committee, 2003):

1. The category of micro, small and medium-sized enterprises (SMEs) are made up of enterprises, which employ fewer than 250 persons and, which have an annual turnover not exceeding 50 million EUR, and/or an annual balance sheet total not exceeding EUR 43 million.
2. Within the SME category, a small enterprise is defined as an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million.

3. Within the SME category, a micro-enterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million.

In our days, SMEs are the component elements of the structure of all economies and societies in the world. Small and medium sized enterprises contribute significantly to the economic development, production, competitiveness, employment, as well as to the decentralization and social coherence. They also function as the source of new enterprises, innovative products and applications and flexible business forms, while they meet the local needs and form the zoning plan for the distribution of employment and income (Singh and Garg, 2008; Thomson and Gray, 1999; Storey, 1994).

E-Business And Business Performance: The OECD Working Party on Indicators for the Information Society proposes a definition of e-business as "automated business processes (both intra- and inter-firm) over computer- mediated networks", with the imperative conditions that "the process integrates tasks (i.e. a value chain) and extends beyond a standalone / individual application" and that "the processes should describe functionality provided by a technology, not a specific technology per se" (OECD, 2003; Sectoral e-Business Watch, 2009). E-business has a pervasive impact across the entire span of the organisation's structure (from the purchasing department to the field sales force) and across a range of its business processes (from internal administration to supply-chain coordination) (Wu et al., 2003). Using internet technologies in conjunction with office automation software and Enterprise Resource Planning (ERP) may help reduce fixed and overhead costs, while internet Electronic Data Interchange (EDI), Business to Business (B2B), and Business to Consumer (B2C) applications may reduce the variable cost of the manufacturing and distribution processes of the product (Quan et al., 2003). Advances in e-business applications and technologies present many opportunities for contemporary businesses to redefine their strategic objectives and enhance or transform products, services, markets, work processes and business communication. By integrating strategy content and process perspectives we begin to more fully explain why, when and how certain firms are successful with e-business systems while others remain hesitant, unwilling or unable to change (Cotman et al., 2007).

E-Commerce And Business Performance: The OECD proposed two definitions of e-commerce - one narrow and one broad. While the narrow definition focuses on "internet transactions" alone, the broad definition defines e-commerce as "the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organizations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the goods or service may be conducted on- or offline" (OECD, 2001). The OECD's Electronic Commerce Business Impacts Project studied a set of 220 early successful adopters of e-business strategies in a range of established sectors in eleven different countries. This study showed the positive impacts of e-commerce on their turnover and profitability and to a lesser extent on employment, most notably when e-commerce is part of larger business strategies of firms (OECD, 2002). Numerous studies attempted to examine the benefits to be gained from e-commerce (EC) adoption towards firm's performance. There are many evidences to support the positive impact of EC on firm performance such as firm growth (Raymond et al., 2005), financial gain (Beck et al., 2005; Johnston et al., 2007; Raymond et al., 2005), competitive advantage (Teo, 2007; Teo and Pian, 2003) and implementation success/satisfaction (Chong, 2008). Such studies are highly welcomed as SMEs use of EC depends on its expected benefits apart of the cost that firm have invested (Mohamad and Ismail, 2009).

E-CRM And Business Performance : Customer relationship management (CRM) is a tool designed to integrate and automate management of all client-facing tasks in order to help build and retain their loyalty. CRM refers to the utilization of extensive strategies and engineering to find, obtain, cultivate advantaged customers, and hence maintain long-term partnerships (Sin et al., 2005). In the CRM context ICT allows for an efficient processing of customer data (Brady et al., 2002), a wide geographical reach

(Javalgi and Ramsey, 2001) and for cost-effective forms of interaction between the organization and its customers (Schroder and Madeja, 2004; Kim and Umanath, 2005). Much electronic customer relationship management (e-CRM) research has been carried out in larger firms with little attention to SME's needs (Adebanjo, 2003; Boyle, 2001; Koh et al., 2007). In practice, only a small percentage of SMEs have implemented sophisticated ICT to support CRM objectives (Ritchie and Brindley, 2005; Maguire et al., 2007). Those firms serving international markets, tend to place greater emphasis on e-CRM and are reaping greater benefits. Benefits range from entry into new markets, enhanced customer service, generation of greater efficiencies in marketing, reduced business cost, increased sales, and improved profitability (Harrigan et al., 2008; 2009). Nevertheless, Kula and Tatoglu (2003) and Harrigan et al. (2008) reported that the ultimate impact of e-CRM on an organisations' profitability is debatable in the absence of more conclusive empirical evidence.

Employment of ICT practioners and business performance: "ICT practitioner skills" are the capabilities required for researching, developing, designing, strategic planning, managing, producing, consulting, marketing, selling, integrating, installing, administering, maintaining, supporting and servicing ICT systems (Sectoral e-Business Watch, 2009). Hwang (2004), in a study of the relationship between the diffusion of ICTs and changes in skills in the UK within business organizations, found that education and training were important in adjusting skill changes to the rapid expansion of ICTs. Inadequate ICT skills impacts firm performance. Forth and Mason (2006) assessed the impact of ICT skill shortages on financial performance at firm level for UK enterprises in 1999 and there was a clear evidence about the negative effects on performance experienced by those companies in which ICT skill shortages inhibited the adoption or intensive utilisation of ICTs.

ICT Investments And Business Performance: According to the Special Report of e-Business Watch (2006), the effects of ICT on performance are subject to debate because not all studies have demonstrated clear payoffs from ICT investments (Chan, 2000, Kohli and Devaraj, 2003). Also, the results vary depending on how performance and ICT payoffs are measured and analysed. For example, one empirical study finds positive impacts of ICT investments on productivity, but not on profits (Brynjolfsson and Hitt, 1996). Another study did not find positive effects of ICT capital on productivity, while ICT labor positively contributed to output and profitability (Prasad and Harker, 1997). An analysis of the profitability of ICT investments in an empirical study that explicitly considered the competitive dynamics in a market showed that the profits of non-adopters of ICT are reduced as other firms adopt new ICT (Stoneman and Kwon, 1996).

Product-services innovations related or enabled by ICTs and business performance The relationship between ICT and turnover growth is straightforward: The implementation of new ICT and complementary investments can lead to innovations, and innovations are positively associated with turnover growth. In other words, innovative firms are more likely to grow. This holds for ICT- and for non-ICT-related innovations, as well as for process- and product-innovations. The empirical results support this view and indicate that innovative firms exhibit increasing turnovers significantly more frequently than non-innovative firms (e-Business Watch, 2006). Hempell et al. (2004) using panel data for German and Dutch firms from the services sector found evidence for direct benefits from ICT product and process innovation on total factor productivity (TFP) in services. Firms that innovate permanently show higher TFP levels. However, the direct impacts of innovation on multi-factor productivity seem to be more robust for Germany than for the Netherlands.

DATA AND METHODOLOGY

Research Design

In order to address the preceding research questions, we used data from the ‘Sectoral e-Business Survey (SeBW) 2007’. This global survey is part of the “e-Business Watch”, a service launched in 2007 and provided by “empirica GmbH” to the European Commission, Enterprise and Industry Directorate General, in co-operation with renowned international partners (European Commission and the Sectoral e-Business Watch, 2007) while it was presented as a Confidentialized Unit Record File. The key objective of the SeBW is to gather information about the usage of ICT and their application to the electronic business in companies, in order to derive indicators on industrial sector level. The fieldwork was carried out from August 13 to October 08, 2007 and had a scope of 2.121 telephone interviews with decision-makers from three industry sectors (chemical, steel and furniture) in seven EU countries (UK, France, Germany, Sweden, Spain, Italy and Poland). The target respondent within the company was a person responsible for or taking part in decisions concerning the use of information and communication technologies and of e-business. This person could have been in different positions, depending on the size and kind of company or organisation – usually the IT manager or a senior professional in the IT department. Particularly in the case of larger companies, there are dedicated positions for e-business management while in micro and small enterprises, the respondent rather is someone at the level of managing director or owner. The questionnaire collected information on the background information of the firms, ICT-related characteristics (such as infrastructure, software systems, skills requirements, costs, impacts, drivers and inhibitors) and innovation activity (if any) of the firm during the past 12 months.

Sample and Data Collection

The sample drawn (for each sector) was a random sample of companies, stratified by sector and, where possible, size (number of employees in the company), was selected per country. The quality of the survey frame was of very high importance. In order to ensure the best possible quality of results in terms of raising the survey data, SeBW explicitly instructed the institutes that the sampling/ address purchase and the universe figures (sample frame) should be based to the largest possible extent on “official” business registers and company statistics, which are usually run by the National Statistical Office in the country. Wherever possible for the drawing of the sample the same source was chosen as for building-up the universe. However, in some countries the statistical offices that were used for the universe figures were not able (resp. were not allowed) to provide the institutes with full and up-to-date addresses or telephone numbers of companies at all. In case where the sampling/ address purchasing could not be obtained directly from the respective national statistical offices, the countries used renowned address supplier of the highest possible quality in terms of coverage and up-to-dateness. This is common practise in business-to-business surveys. Furthermore, the usage of computer/PC (including desktop computers and notebooks) within the company was required in order to qualify for an interview.

The final allocation of our sample ($n = 1.716$ SMEs) according to firm size, industry and country is illustrated as follows (Table 1):

In this survey, a cut-off was introduced with regard to company size: only companies with at least 10 employees were interviewed. The highest level of the population (at least 10 employees) was the set of all computer-using enterprises which were active within the national territory of one of the seven countries covered, and which had their primary business activity in one of the three industry sectors specified on the basis of NACE Rev. 1.1.

Table 1: Industry and Country Distribution of the Sample and Sampling Sources

			Firm Size Small (10-49)			Firm Size Medium (50-249)			
Countries			Survey Sectors			Survey Sectors			Total
			Chemical, rubber & 45	Steel 72	Furniture 67	Chemical, rubber & 39	Steel 23	Furniture 36	
Germany	Count		45	72	67	39	23	36	282
	% within sector Count		16.0%	25.5%	23.8%	13.8%	8.2%	12.8%	100.0%
Spain	Count		65	43	114	52	5	6	285
	% within sector Count		22.8%	15.1%	40.0%	18.2%	1.8%	2.1%	100.0%
France	Count		70	8	69	57	8	10	222
	%within sector Count		31.5%	3.6%	31.1%	25.7%	3.6%	4.5%	100.0%
Italy	Count		57	61	67	39	24	41	289
	%within sector Count		19.7%	21.1%	23.2%	13.5%	8.3%	14.2%	100.0%
Sweden	Count		74	17	26	26	8	9	160
	%within sector Count		46.3%	10.6%	16.3%	16.3%	5.0%	5.6%	100.0%
United Kingdom	Count		69	30	84	48	8	12	251
	%within sector Count		27.5%	12.0%	33.5%	19.1%	3.2%	4.8%	100.0%
Poland	Count		67	3	79	46	12	20	227
	% within sector Count		29.5%	1.3%	34.8%	20.3%	5.3%	8.8%	100.0%
Total	Count		447	234	506	307	88	134	1.716
	% within sector		27.6%	12.7%	28.9%	18.1%	5.0%	7.5%	100.0%

This table shows the allocation of sample by country, industry sector and firm size.

Measure Development and Statistical Method

In order to examine the complex two-way interactions among variables that affect the performance of European manufacturing SMEs, a hierarchical log linear analysis was applied. The major emphasis of log-linear analysis is to obtain a log-linear model that is linear in logarithms of the expected frequencies of a contingency table and that adequately describes or fits the associations and interactions that exist in the contingency table as closely as possible (Wrigley, 1985). The principal reason for utilizing log-linear procedures in this study lies in the fact that interactions and interrelationships underlying categorical survey data can be analytically highlighted. A backwards elimination was used to remove non-significant two-way interactions between variables using a statistical significance cut-off of 0.05. Associations for each predictor against dichotomized outcome were tested using chi-squared test analyses. At this point, we need to say that we decide to limit the number of variables to eight (including outcome) in the model for three reasons. First, in accordance with log linear modeling theory (Norusis, 2008), the inclusion of excess numbers of variables increases the number of cells with few observations and, as a result, we can neither estimate the parameters well nor assess the goodness of fit of the model well. Secondly, the technique of hierarchical log linear analysis excludes the missing values, limiting the sample size further. In our analysis, 228 out of 1.716 cases were excluded as missing values, reducing our sample size to 1.448 cases. Thirdly, with log linear models, we need at least 5 times the number of cases as cells in our data (Christensen, 1997). In this case, we have a 2^8 table; this means we need to have at least 1.280 cases ($2^8 * 5$). Indeed, we have 168 cases (1.448 – 1.280) more than lower level of 1.280, but we could not add up an extra variable because in that case we would need a sample consisting of at least 2.560 cases ($2^9 *$

5). We therefore, eventuate that the complex interactions-relationships among variables identified in this study are statistically robust. Table 2 details the research variables used to this study including concept, operational measure and sampling source. In log linear models, all variables that are used for classification are independent or predictor variables and the dependent variable is the log of the number of cases in a cell of the multiway cross-tabulation (Norusis, 2008). The outcome variable *firm performance* is empirically measured in terms of turnover growth. The raw data were coded and analyzed using the PASW Statistics 18.

Table 2: Summary of Research Variables

<i>Predictor Variables</i>	<i>Abbreviations of Variables</i>	<i>Description – Operational Measure</i>	<i>Source</i>
Firm Performance (outcome)	FP	Respondents were asked to rank their firm's turnover level when compared the last financial year with the year before. The scale used was a three-item measure with a 1 = increased, 2 = stayed the same and 3 = decreased. The outcome variable was converted into a binary variable prior to analysis within the hierarchical log linear model (0 = increased/stayed the same and 1 = decreased).	European Commission 'SeBW 2007'
Implementation of e-CRM	e-CRM	The respondents were asked whether their firm had implemented an e-CRM system (0 = yes and 1 = no).	European Commission 'SeBW 2007'
ICT Practitioners	ICTP	The respondents were asked whether their firm had employed personnel with ICT qualification (0 = employment and 1 = non-employment).	European Commission 'SeBW 2007'
ICT Investments	ICTI	The respondents were asked whether their firm had made investments in ICT during the past 12 months, for example for new hardware, software or networks (0 = yes and 1 = no).	European Commission 'SeBW 2007'
ICT-related Product-services Innovations	ICTInv	The respondents were asked whether their firm had launched any new or substantially improved products or services, which had been directly related to or enabled by ICT (0 = yes and 1 = no).	European Commission 'SeBW 2007'
E-Commerce Activities	eCom	The respondents were asked whether their firm had used the internet or other computer-mediated networks to order goods or services from suppliers online, not counting manually typed e-mails (0 = yes and 1 = no).	European Commission 'SeBW 2007'
E-Business Activities	eBus	The respondents were asked whether their firm had used automated business processes to collaborate with business partners in the design of new products or services (0 = yes and 1 = no).	European Commission 'SeBW 2007'
Rivalry in the Market	RM	The respondents were asked whether the rivalry in their market was increasing (0 = yes and 1 = no).	European Commission 'SeBW 2007'

This table lists the variables that were incorporated into the hierarchical log linear model, their abbreviations, the operational measures as well as the sampling source.

EMPIRICAL RESULTS

Analysis of Associations between Outcome Variable and Response Variables Prior to testing the complex interactions among variables that affect the performance of European manufacturing SMEs, we first ran cross-tabulations of all response variables with outcome variable (firm performance). The results are shown in Table 3.

As seen in Table 3, using the chi-square tests, all the related *p*-values are less than the traditional threshold of 0.05. Thus, it can be verified that there are statistically significant association between the employment of ICT practitioners, investments in ICTs, ICT-product/services innovations, adoption of e-commerce and e-business activities, implementation of e-CRM system, competitive pressure and whether firms had experienced a constant annual rate of turnover growth or not.

Table 3: Respondent Profile and Chi-Squared Tests

		Firm Performance (outcome variable)		Total	Chi-Square Test	
		Increased / Stayed the Same	Decreased			
Employment of ICT practitioners	yes	Count	347	13	360	
		% within FP	23.1%	12.7%	22.4%	
		Adjusted Residual	2.4	-2.4		
no		Count	1157	89	1246	
		% within FP	76.9%	87.3%	77.6%	5.857*
		Adjusted Residual	-2.4	2.4		
Total		Count	1504	102	1606	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
Investments in ICT during the past 12 months	yes	Count	1089	52	1141	
		% within FP	72.7%	52.0%	71.4%	
		Adjusted Residual	4.4	-4.4		
no		Count	408	48	456	
		% within FP	27.3%	48.0%	28.6%	19.775***
		Adjusted Residual	-4.4	4.4		
Total		Count	1497	100	1.597	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
Innovation of Products-Services during the past 12 months	yes	Count	616	28	644	
		% within FP	41.3%	27.5%	40.5%	
		Adjusted Residual	2.8	-2.8		
no		Count	874	74	948	
		% within FP	58.7%	72.5%	59.5%	7.648**
		Adjusted Residual	-2.8	2.8		
Total		Count	1490	102	1592	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
Implementation of e-CRM system	yes	Count	302	10	312	
		% within FP	20.3%	9.9%	19.6%	
		Adjusted Residual	2.5	-2.5		
no		Count	1185	91	1276	
		% within FP	79.7%	90.1%	80.4%	6.490*
		Adjusted Residual	-2.5	2.5		
Total		Count	1487	101	1588	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
E-Commerce Activities	yes	Count	932	45	977	
		% within FP	61.9%	44.1%	60.8%	
		Adjusted Residual	3.6	-3.6		
no		Count	573	57	630	
		% within FP	38.1%	55.9%	39.2%	12.712***
		Adjusted Residual	-3.6	3.6		
Total		Count	1505	102	1607	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
E-Business Activities	yes	Count	197	3	200	
		% within FP	13.2%	3.0%	12.6%	
		Adjusted Residual	3.0	-3.0		
no		Count	1291	97	1388	
		% within FP	86.8%	97.0%	87.4%	8.924**
		Adjusted Residual	-3.0	3.0		
Total		Count	1488	100	1588	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				
Rivalry in the market is increasing	yes, is agree	Count	1041	88	1129	
		% within FP	71.1%	88.0%	72.1%	
		Adjusted Residual	-3.7	3.7		
no, disagree		Count	424	12	436	
		% within FP	28.9%	12.0%	27.9%	13.369***
		Adjusted Residual	3.7	-3.7		
Total		Count	1465	100	1565	
		% within FP	100.0%	100.0%	100.0%	
		Adjusted Residual				

This table shows the count, percentage use, adjusted residuals and the statistical results of the Chi-square test between firm performance (outcome variable) and response variables. In all above tests, there is no violation of the basic rule for using chi-square test (the expected values in each cell be greater than 1 and that most cells have expected values greater than 5 (Norusis, 2008)). * The value is significant at the 0.05 level. ** The value is significant at the 0.01 level. *** The value is significant at the 0.001 level.

The Chi-square test tells us that there is some departure from statistical independence, but it says nothing about the nature of this departure or how strong it is. Post hoc analyses of the contingency table cells are based on adjusted residuals that are calculated by dividing the residual (i.e., the difference between observed and expected cell frequency) by the standard error of the contingency table cell. The adjusted residuals (highlighted in pale orange) of all categories of response variables are greater than 1.96 in their absolute magnitude, indicating significant deviations from the independency assumption.

Hierarchical Log Linear Analysis

The results reveal seventeen out of an original twenty-eight possible two-way interrelationships between the chosen variables were identified as remaining in the hierarchical log linear model. Two-way interactions were investigated only because trying to make sense of three-way and higher-way interactions is notoriously difficult, so the reason for limiting to two-way was simple pragmatic, based on the need to keep any interpretations as simple as could be. Making the interactions any more complex does not help and may actually hinder interpretation of what the multivariate data are saying.

Table 4 lists the individual statistical inter-relationships between the various predictors, the chi-square value and the *p*-value. The inter-relationships are ranked with the strongest statistical association at the top of the table.

Table 4: Statistical Inter-Relationships between Parameters within Hierarchical Log Linear Model

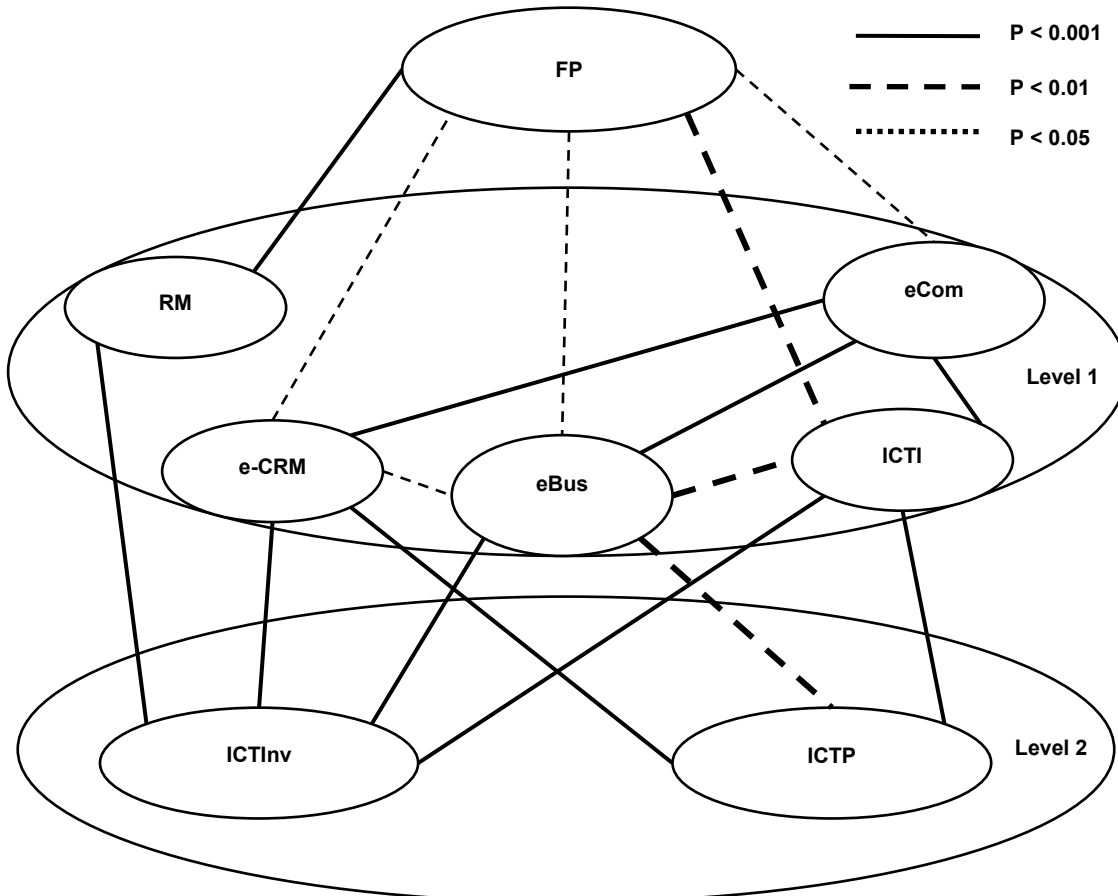
Two-Way Interaction Parameters	Chi-square	df	<i>p</i> -value
eCom*e-CRM	26.221	1	0.0001
eCom*ICTI	14.650	1	0.0001
eCom*eBus	30.590	1	0.0001
e-CRM*ICTInv	14.341	1	0.0001
e-CRM*ICTP	28.356	1	0.0001
ICTInv *ICTI	65.771	1	0.0001
ICTInv *RM	15.201	1	0.0001
ICTInv *eBus	17.897	1	0.0001
ICTP*ICTI	40.368	1	0.0001
RM*FP (outcome)	16.684	1	0.0001
ICTP*eBus	10.375	1	0.001
ICTI*FP (outcome)	10.946	1	0.001
ICTI*eBus	8.400	1	0.004
FP (outcome)*eBus	6.097	1	0.014
eCom* FP (outcome)	4.353	1	0.037
e-CRM* FP (outcome)	4.183	1	0.041
e-CRM*eBus	3.873	1	0.049

*This table lists all the statistical inter-relationships between the various variables with a *p*-value <0.05.*

At this point we have to make clear that the above statistical association does not in itself imply the direction of the relationship, for instance, the statistical relationship between e-CRM x FP (outcome) in this model does not tell us whether the implementation of e-CRM of non- implementation is responsible for a firm's turnover growth.

Figure 1 illustrates the model graphically by linking the various predictors by lines whose thickness is representative of the strength of association between the predictors. The predictors have been structured into a hierarchy to illustrate the directness of the impact of the variable on outcome.

Figure 1: Hierarchy of Relationship between Outcome and Variables



The figure illustrates the statistical inter-relationships between the various predictors using the lines linking them.

As seen in above figure, five variables within the hierarchical log linear model (ICT investments, e-commerce and e-business adoption, e-CRM implementation and rivalry in the market) had a direct independent statistical relationship with firm performance. The remaining two variables (ICT-related product/service innovations and employment of ICT practitioners) only had a statistical relationship with business performance via at least one other variable. The thickness of the lines relates to the strength of statistical association in the model ranked by p-value.

Regarding the overall model's fit, two statistics were used; the Pearson and the likelihood ratio chi-square. The value for the first was 184.67 and for the latter was, 189.36 and the related observed significance levels were 0.98 for both statistics. This means, that both indices do not detect a lack of fit of the model. The overall goodness-of-fit test tells us if the model appears to fit the data. It does not tell us whether there are particular cells that the model fits poorly or whether there is a systematic lack of fit. In order to see how well the model fits the individual cell, we examined the residuals for each cell. Only five out of 256 cells were found with standardized residuals greater than 1.96, indicating that the model fits poorly (only for these five cells), while the model fits very well for the remaining 249 cells. We can

conclude by saying, that goodness-of-fit test and residuals give a strong indication that the fit of the log linear model that was applied is fully satisfactory.

DISCUSSION

From the results, we are able to make multiple observations. More precisely, the log linear analysis revealed seventeen appreciable complex interactions among variables affecting direct or indirect the performance of European manufacturing SMEs. The findings are presented and discussed as follows:

Interrelationships between ICTs (e-CRM, e-Commerce and e-Business) and firm's Performance ($P_{e-CRM} = 0.041$, $P_{e-Com} = 0.037$ and $P_{eBus} = 0.014$): A large body of content research shows that various ICTs influence business performance. Johnston and Carrico (1988), in their study of 11 industries found that external pressures played a significant role in explaining the link between IT implementation and performance. Along the same line, Santhanam and Hartono (2003) find that superior ICT capability is associated with improved performance. While it is generally accepted that ICT implementation affects company performance and characteristics as well as the environment in which companies operate, different companies in different sectors exhibit varying payoffs despite similar investments in ICT (Dhar and Sundararajan, 2007). The European e-Business Report 2008 found strong evidence at the company level that ICT use is associated with increases in turnover, whilst at the sector level, the results were much less pronounced (European Communities, 2008). Building on these findings, we lead to Melville's statement that firm performance improvement will result, if the right ICT is applied in the right way (Melville et al., 2004).

Strong Interrelationship between e-CRM and e-Commerce ($P_{e-Com} < 0.0001$): Several studies primarily focused on the relationship between CRM and customers relationships. Day and Hubbard (2003) argue that the personalization of relationships is a significant benefit of CRM. By electronically recording the purchasing history of customers and providing the metrics for calculating each customer's profitability, CRM allows SMEs to tailor offerings and predict future behavior. Likewise, Ramani and Kumar (2008) found that good CRM between manufacturing firms and industrial customers not only retains customers but also encourages them to provide important suggestions for improving products and service. Finally, Sin et al., (2005) indicated that CRM involves activities that manufacturers practice to satisfy customer needs, identify customer preferences, resolve customer complaints, provide after-sale service and establish long-term relationships with their customers.

Interrelationship between CRM adoption and Firm's e-Business Activities ($P_{e-Bus} = 0.049$): Numerous studies have proven that using information provided by clients facilitates the development of more diverse new products and modifications to the functions of existing products to meet the needs of specific target markets (Verhoef, 2003; and Lagrosen, 2005; Souder et al., 1997). A more recent study conducted by Groznik et al., (2008) concludes that technology-based CRM apparently enhances operational efficiency, increases productivity and improves collaboration and service quality.

Interrelationships between ICT – Practitioners and ICTs (e-CRM, e-Business and ICT investments) ($P_{CRM} < 0.0001$, $P_{eBus} = 0.001$ and $P_{ICTI} < 0.0001$): Our empirical results reveal a strong interrelationship between e-CRM adoption or non-adoption and the employment or non-employment of ICT qualified users. Several studies have confirmed the relationship between ICT usage and employment of ICT-qualified personnel. Specifically, the empirical study of Brynjolfsson and Hitt, (2000) indicates that ICT is most productive when combined with complementary investments in working practices, human capital, and company restructuring. Moreover, the efficient use of information and communication systems demands significant investment in qualified personnel and employee education (Cooper et al., 2005). The 2003 OECD Ministerial report, "seizing the benefits of ICT in a digital economy" concluded that having a good supply of qualified personnel helps, but education policies need to be supplemented with actions to

foster lifelong learning. Policies aimed at enhancing basic literacy in ICT, at building high-level ICT skills, at lifelong learning in ICT and at enhancing the managerial and networking skills needed for the effective use of ICT are particularly important.

Strong interrelationships between ICTs (e-CRM and e-Business) and ICT-related product/service innovations (both P values < 0.0001): Several studies recognized the role of ICTs in supporting product and service innovations. For example, Lin et al., (2010), based on a completed survey by 107 Taiwanese manufacturing firms, finds that technology-based CRM has a positive effect on product and service innovations. Other recent studies found that the effectiveness and efficiency of e-business systems are increasingly recognized as means for developing innovation capability and providing a lasting competitive advantage (Ramani and Kumar, 2008; Sahay and Ranjan, 2008). The European e-Business Report (2008) continued in the same vein, indicated that ICTs are increasingly recognized as an important tool for innovation and increasing revenues by enabling new services and new ways of working within value networks (European Communities, 2008).

Strong interrelationships investments in ICTs and e-Commerce - e-Business ($P_{eCom} < 0.0001$ and $P_{eBus} = 0.004$): A thorough literature review of factors affecting SMEs e-commerce adoption shows that one of the most significant factors include resource constraints such as financial and human resources of the firm (Jeyaraj et al., 2006). In the same way, a recent research conducted by Scupola, (2009) indicates that the firm's resource constraints, both human and financial, have been a significant factor in e-business adoption and implementation in Denmark and Australia.

Strong interrelationship between e-Commerce and e-Business ($P < 0.0001$): Considering a significant report conducted by OECD (2004) some businesses, mainly early adopters of e-commerce, are entering the next stage of ICT use, e-business. They have begun to engage in increasingly sophisticated uses of ICT, involving business process reengineering and more technology that is complex. In such firms, B2C and B2B e-commerce are components of an overall e-business strategy. External relations with customers as well as internal processes are being linked. Marketing and sales, logistics and delivery, after-sales service, supply chain management and other business functions are integrated in an overall e-business strategy. Additionally, the report predicts that in the near future, electronic commerce and electronic business will have to become components of SMEs' overall e-business strategy and "normal" business processes that are supported by ICTs and carried out on electronic networks.

Strong interrelationship between ICT-related product/services innovations and ICT investments ($P < 0.0001$). A recent empirical study conducted by Dibrel et al., (2008) argues that in order to optimize investment in innovation activities, IT initiatives should be aligned with innovation. Furthermore, the same study concludes that managers who are able to integrate either a product or a process-oriented innovation strategy with investments in IT enhance their firms' relative performance along two essential dimensions: profitability and growth. In contrast, a failure to invest in IT can cause a firm to be unable to support its innovation initiatives. Perhaps, a lack of investment in IT over time may render the firm incapable of meeting customer requirements.

Strong interrelationships between firm performance, ICT-related innovations and rivalry (both P values < 0.0001): Log linear analysis obviously shows strong interrelationships between firm performance, ICT-related innovation and rivalry in the market. This is in line with the findings from European Communities (2008), indicating that as companies are facing more intense competition, they are under pressure to cut costs and to look for more innovative ways of conducting business. In addition, empirical studies have consistently shown that external pressures played a significant role in explaining the link between ICT implementation and performance (Coltman et al., 2007). According the OECD (2003) "Ministerial Report", competition is the key to selecting successful firms and makes them innovate and

grow. A competitive environment is more likely to lead a firm to invest in ICT, as a way to strengthen performance and survive, than a more sheltered environment.

Interrelationship between firm performance and investments in ICTs (P = 0.001): Regarding this relationship, the related literature refers that firm performance is enhanced when there are synergies among the elements of a system. Complementary factors of a system of mutually enhancing elements operate in such a way that doing more of one thing increases the returns of doing more of another (Huang and Liu, 2005). As such, investment in ICT does not stimulate productivity and growth (i.e., firm performance) without a number of complementary developments, and, even then, resource commitment in ICT may detract from short-run profitability (Johannessen, Olaisen, and Olsen 1999).

The above findings support the suggestion that there are complex interactions between the outcome variable and the seven-predictor variables. Of course, we have to reiterate that this statistical technique does not imply by itself the direction of the above interrelationships, but only the existence of those interrelationships.

CONCLUSION, IMPLICATIONS AND FUTURE RESEARCH

The purpose of this exploratory study was to use the hierarchical log linear model to analyze a set of cross-classified categorical data in order to examine the complex interactions among variables that affect the performance of European manufacturing SMEs. Seven variables (*employment of ICT practitioners, investments in ICTs, product-services innovations related to or enabled by ICTs, adoption of e-commerce and e-business activities, implementation of e-CRM and competitive pressure*) that associated with the outcome variable *firm performance* in a chi-square test analysis were used to derive and present a hierarchical log linear model.

The results reveal seventeen out of an original twenty-eight possible two-way interrelationships between the chosen variables were identified as remaining in the hierarchical log linear model. Five variables within the hierarchical log linear model (ICT investments, e-commerce and e-business adoption, e-CRM implementation and pressure from competition) had a direct independent statistical relationship with firm performance. The remaining two variables (ICT-related product-service innovations and employment of ICT –qualified personnel) only had a statistical relationship with business performance via at least one other variable.

Although hierarchical log linear analysis is a well established, powerful, multivariate statistical method, it has not been widely employed in business research. Numerous statistical methods have been utilized to generate predictive models that identify factors affecting performance of businesses. While these models provide an accurate statistical description between these variables and outcome, they are difficult to present the complex interactions visually. This study contributes toward this direction and it is an inspiring source for those who want to investigate pictorially the complex interactions of factors affecting the performance of European manufacturing firms. Additionally, the analysis strongly suggests that companies taking into account different factors can improve the chances to make better implementation of ICTs, and thus attain better levels of business performance.

Of course, this work is not free from limitations. Taken that the findings in this study are based on seven selected European countries, they cannot be generalized to the entire population of manufacturing SMEs. The analytical investigation of hypothesized associations has been approached from a European point of view. Thus, the interpretation and utilization of the research findings should be thoroughly scrutinized. Additionally, the particular statistical method reveals the complex associations between variables but does not reveal the direction of those associations. Future researches would be interesting to see them too.

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ACKNOWLEDGEMENTS

The authors wish to express their sincere appreciation to the European Commission and the Sectoral e-Business Watch for supplying the raw data sets of their e-Business Surveys (2002, 2003, 2005, 2006,

2007). These valuable raw data sets help the authors to develop the ideas put forward here. The authors are grateful for the publisher's generous permission to use the raw data sets.

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ANTECEDENTS AND CONSEQUENCES OF MARKET ORIENTATION IN NON-PROFIT ORGANIZATIONS: EVIDENCE FROM MALAYSIA

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ABSTRACT

An emerging perspective on market orientation suggests that strategic insights may be gained when firms take into account their customers' view on the organization's level of market orientation. Recent research offers evidence on the applicability of a customer-defined market orientation construct. This study extends this line of research by exploring the customer-defined market orientation antecedents and outcomes in nonprofit organizations such as higher education institutions. This paper accentuates the subject by reviewing a number of theoretical viewpoints as to why a customer perspective should be sought when assessing organizational phenomena such as market orientation. Based on a study conducted on students of a local Malaysian university, this study extends the notion of market orientation to include service quality and customer satisfaction.

JEL: M3

KEYWORDS: Market Orientation, Nonprofit Organization, Marketing Strategy, Higher Institutions

INTRODUCTION

The formation and implementation of strategy and missions in non-profit organizations like higher education institutions (HEI) has become essential. The role of nonprofit organizations is becoming more significant in the market as numbers of new nonprofits are soaring. However, existing nonprofits are failing (Cordes et al., 2001; Ministry of Higher Education, 2007). The rapid growth of nonprofit organizations has created more intense competition for financial support, employees, and volunteers among these organizations (Schmid, 2004; Thompson, 2002). Reductions in government funding and a lack of sponsorship have added to the competitive pressure. At the same time, demand for performance by stakeholders has increased (Dees, et al., 2001; Herman & Renz, 2004). These conditions have forced HEIs to continue to define and refine their strategies and processes to ensure realization of their missions. Prospective students demand that HEI's provide better quality service and offer "high value programs and services". Demands for increasing student enrollments, the pressure to satisfy industry needs and increasing sophistication has lead HEI's to pander to students in a manner consistent with a market orientation perspective. Since the nature of university services requires human interaction with external and internal customers, a market orientation would be particularly important for universities. HEIs not only need to be responsive to customer groups, they ought to provide rigorous, thorough, and relevant educational programs to serve the long-term interests of students and the institution itself.

While there is a great deal of literature on market orientation in the profit sector (Narver and Slater, 1990; Pelham & Wilson, 1996), studies of market orientation in the nonprofit are limited. Studies by Morris et al (2007); Kara et al. (2004) and Vazquez et al. (2002) have added to the recent literature on market orientation in nonprofit organization. Nonprofit organizations are facing two primary challenges, one is a resource allocation market and second is a resource attraction market (Segal, 1991). Market orientation of nonprofit organization can affect activities and programs directed towards beneficiaries and donors. Unlike for profit organization where assignment and attraction of resources is simultaneous, in nonprofit

organization these two tasks are separate involving different target publics and different needs (Shapiro, 1973; Kara et al. 2004). Hence, for nonprofit organization like HEIs to sustain their existence, they need to provide quality programs and services. In addition, the importance of a market-oriented culture is crucial to all levels of the modern organization (Day, 1994; Deshpande et al. 1993) and nonprofit universities are not excluded. Dealing with competitive and economic pressures, these institutions need to identify their own funding rather than relying heavily on the government and look at other cost cutting and revenue increasing mechanisms (Caruana et al., 1998; Thomson, 2002). Apart from that, they also face increasing complex social needs, growing affluence, competition for human resources, increased regulation and accountability and escalating costs (Alexander, 2000; Thompson, 2002). Existing questions include the extent to which HEI offer programs that adopt a market orientation perspective in their institution? And, do the course structures, curriculum and HEI services depict the needs and wants of the customer?

Previous studies have exclusively considered market orientation as an ‘employee or manager -perceived phenomenon. As a result, subsequent studies pertaining to a firm’s market orientation generally have been based on employee self reports. There has been criticism of this view. The ‘customer-defined position’ argues that the adoption of the ‘employee/manager-defined’ view of market orientation is one-sided and myopic as it ignores the vital role of customers in terms of value recognition (Webb et al., 2000). They emphasize it is the customers - as opposed to sellers – perceptions of the level to which a firm is market oriented that is the critical measure of business performance. This argument extends from Deshpandé et al. (1993) assertion that the evaluation of a firm’s extent of customer orientation (market orientation) should also come from customers, and not just the managers of the firm itself. In the case of higher education programs, the issue becomes more pertinent where academic programs in HEI are charged with being out of sync with the reality. As a matter of fact, Drucker (1954) commented on the issue over five decades ago when he argues that marketing is not a specialized activity, but rather the whole business seen from the customer’s point of view. As such, it seems not only intuitively logical but also necessary to view market orientation from the customer vantage.

Drawing from the above argument, an emerging perspective from researchers such as Steinman et al., (2000) and Webb et al. (2000) suggests that beneficial strategic insights may also be gained when firms take into account their customers’ view on the organization’s level of market orientation. These authors argue that an organization can be described as market-oriented only when the firm’s total product offerings are both recognized and described by customers in value terms. In other words, when the customers perceive the firm is market-oriented and offers considerable value to them, only then can the organization be described as market-oriented. This would subsequently lead to customer satisfaction as a result of the organization being market oriented. Apparently, the proposed relationship between market orientation and customer satisfaction will be more appealing when both constructs are measured from a customer vantage. While the explanation of the market orientation and customer satisfaction relationship may appear somewhat tautological, with the exception of an exploratory study by Webb et al. (2000), there is no empirical study on the relationship. As such, an empirical validation on its proposed linkage deserves explicit consideration. Webb et al.(2000) argue that customer satisfaction is a result of the organization being recognized and described as market oriented by customers. With the exception of the Webb et al. (2000) exploratory study, limited empirical studies on the relationship exist. As such, an empirical validation on its proposed linkage deserves explicit consideration.

The majority of the studies on market orientation were done in developed economies whereas there is a dearth of market orientation research in developing economies. So far, research on the subject has been mostly focused on gathering evidence from developed economies, and building theories based on that evidence. However, there are few indications on the extent to which those theories may explain market orientation elsewhere. Deshpandé (1999) corroborated that there has been little interest in the generalizability of marketing concepts, models, theories to the non U.S. or non-Western context, even

though such concepts and models might be theoretically inappropriate for emerging markets and transitional economies. Therefore, there is a pressing need for more research on this issues that reflect the reality of developing economies.

This study contributes to the existing literature in several ways. First, the customer-defined market orientation (CDMO) construct will be modified in this study and would validate the market orientation instrument initially developed from the ‘employee-perceived view’ and ‘developed economies bias’ (Hooley et al., 2000). Second, the market orientation and organization outcome framework will be extended by offering a conceptual model in which CDMO is positioned both as antecedent of service quality (SQ) and customer satisfaction (CS). Third, the findings provide some clarifications whether the antecedents for CDMO are similar to market orientation (employee-perceived). Lastly, the relationships between a CDMO and both SQ and CS are investigated. This paper commenced with the discussion on the antecedents of market orientation, then is followed by the arguments on the views of the antecedents with the inclusion of the quality service. Next, this paper discusses the constructs that were used in the study and statistical results were presented. The findings of the study are then presented and summarized and finally the conclusion of the study is provided.

LITERATURE REVIEW

In general, market orientation (MO) is perceived as a philosophy that permeates the organization (Hooley et al., 1990). There are two main perspectives of market orientation; the behavioural perspective by Kohli and Jaworski (1990) and the cultural perspective by Narver and Slater (1990). The central focus of these two perspectives the organization’s customers. Since market orientation involves the operationalization and implementation of marketing concepts (McCarthy and Perreault, 1990), the fundamental premise of satisfying the needs and wants of a firm’s customers should be inherent in the conceptualization of market orientation. Therefore, the needs for companies to understand their customers (Shapiro, 1988), meet their needs now (Ruekert, 1992) and in the future (Kohli and Jaworski, 1990), create value for them (Narver and Slater, 1990) are vital. Kohli and Jaworski (1990) describe market orientation as the ‘organization-wide generation of market intelligence pertaining to current and future customer needs’. They argue that MO comprises of three major elements; the generation of market intelligence; intelligence dissemination and responsiveness to market intelligence.

Generation of market intelligence relies on formal and informal mechanisms such as customer surveys, meetings and discussions with customers and trade partners, analysis of sales reports, and formal market research. However, intelligence generation is not the exclusive responsibility of the marketing department (Kohli and Jaworski, 1990). All functional departments in the company such as R&D, manufacturing, and finance need to obtain information that is relevant regarding customers and competitors. Intelligence dissemination is a part of the organization’s ability to adapt to market needs and relates to the effectiveness of communication among the functional areas. It is significant as it provides a shared basis for concerted actions by the different departments (Kohli and Jaworski, 1990). Kohli and Jaworski (1990) also insist that all departments need to be responsive by selecting the appropriate target markets, designing, producing, promoting and distributing products that meet current and anticipated needs.

Managerial attitude toward change represents the extent to which senior managers are in favor of change (Damanpour, 1991). Manager’s willingness to change would facilitate a firm’s market orientation. Jaworski and Kohli (1993) suggested that top managers play a critical role in shaping an organization’s values and orientation. Senior management clearly plays a key role in being responsive towards change in both private and public sector (Jaworski and Kohli, 1993), they take the primary responsibility and accountability for designing and managing change. It is vital for managers to communicate signals on the importance of being responsive to customers’ needs. Narver and Slater (1995) argue that in market-oriented firm, the priority is to constantly deliver superior value to its customers based on its

understanding of customer needs and market trends. Consumers' expectations, consumption habits, incomes, and product knowledge change rapidly in a transitional economy. Thus, consumers' perceptions of a product's benefits tend to change over time, thus a firm's offerings that meet customers' needs today may not meet their needs tomorrow (Kohli & Jaworski, 1990). For an organization to confront such fast-changing and competitive environments, it would be essential for it to hold organizational characteristics such as the decentralization of decision-making; managerial participation and empowerment; risk-taking and innovative attitudes and flat structures (Miles and Snow, 1986; Ezzamel et al, 1994). Hence, in order to implement a market-driven strategy, firms need organizational changes that will lead to customer value opportunities in new directions. Successful organizational change is not possible without the commitment of top management leaders who play a key role in shaping the organization's norms, customs, values, and behaviors (Day 1999; Harris and Ogbonna 2001; Jaworski and Kohli 1993; Kasper 2002; Locander, Hamilton, Ladik, and Stuart 2002). Therefore, senior leadership commitment is the first step for initiating the changes that are needed for creating a market-driven culture (Day 1994; Locander, Hamilton, Ladik, and Stuart 2002). Hence, this leads to the hypothesis 1: The more positive the managerial attitude towards change, the greater the market orientation of the institutions.

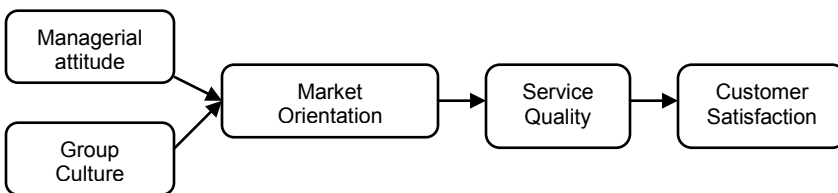
Cultural perspective views market orientation as the organisational culture that creates the required behaviours for the creation of superior value for customers (Narver and Slater, 1990). Narver and Slater (1990) inferred that market orientation consists of three behavioural elements; customer orientation, competitor orientation and inter-functional coordination. Customer orientation requires a sufficient understanding of the customer to create products or services of superior value which is accomplished by increasing benefits to the customers while decreasing the costs. Hence, firms need to acquire information about the customers and comprehend the economic and political constraints. The competitor orientation relates to the organization understanding on the strengths and weaknesses of its current and future competitors, as well as their long-term capabilities and strategies. Inter-functional coordination refers to the coordinated utilization of the company's resources in creating superior value for its customers. The absence of inter-functional coordination will effect on the cooperation between departments, thus they must be sensitive to the needs of all the other departments within the organization. Deshpandé and Webster (1989) defined organizational culture as a shared pattern of values and beliefs which facilitate a person to understand his function in the organization through norms and behavior.

Consistent with this definition, Cooke and Lafferty's (1983); Barney (1986) and Schein (1985) also emphasize that organizational culture not only reflect shared values, norms and beliefs but it is also complex and affect the way members think and behave. As market orientation requires organization-wide coordination in disseminating information and responding to market intelligence, organizational culture is essential and become part of the concept (Kohli and Jaworski, 1990; Narver and Slater, 1990). Organizational culture such as group culture emphasizes the importance of employee unity, cooperation, and sense of belonging to the firm, promotes employees understanding of both the firm and the market, and encourages participation in decision making (Quinn, 1988). This would facilitate the dispersion of ideas within an organization, which leads to the generation of more new ideas (Damanpour, 1991). Group culture creates cohesion among employees and facilitates them to understand why changes and new actions are necessary, thus employees are more willing to work together and engage in inter-functional activities (Zhou, 2004). This creates conducive environment in developing market orientation as it assists in coordinating and disseminating information as well as responding to market intelligence (Kohli & Jaworski, 1990; Narver & Slater,1990). Hence hypothesis 2 : The stronger the group culture, the more market orientated the institution.

Meanwhile, quality of service has been studied in the area of management for years because the market is more competitive and marketing management has transferred its focus from internal performance such as production to external interests such as satisfaction and customers' perception of service quality (Gronroos, 1992). The literature suggests a linkage among market orientation, customer satisfaction and

service quality through the concept of value. In the market orientation literature, provision is positioned as a central organizational objective (Narver & Slater, 1990). There are three equally important prerequisites for the creation of superior customer value. The first two prerequisites basically focus on the customer and competitor orientations. The third prerequisite involves coordinating across the firm's departmental boundaries those activities necessary to deliver superior value (Narver & Slater, 1990). Woodruff et al. (1993) explicate the sentiments of other researchers in stating that by being responsive to customer's needs, customer value delivery strategies are instrumental in building strong customer satisfaction. Webb et al. (2000) exploratory study found that market orientation has a positive relationship with service quality and satisfaction. In customers' interactions with a service firm, they are positioned in the relationship such that they are able to form opinions about the service quality received and consequently construct cognitive evaluations about the organization's level of delivered service (Webb, 2000). These arguments lead to hypothesis 3. Hypothesis 3 : The greater the level of customer-defined market orientation, the greater the level of perceived service quality. Figure 1 summarizes the relationship between the variables.

Figure 1: Proposed Framework



DATA AND METHODOLOGY

This study analyzes market orientation concepts in a nonprofit organization in Malaysia. The organization is a public higher education institution fully owned by the government. The respondents of this study were students currently enrolled in this public university in Malaysia. Out of the total population of 1,266 students, 300 questionnaires were randomly distributed. The clean returned questionnaires were 211 yielding a response rate of 70 per cent. Potential non-response bias was assessed based on Armstrong and Overton (1977) suggestions. There was no significant difference between early and late respondents on any of the key variables, thus reducing the concerns about non-response bias.

A questionnaire was used as an instrument in this study. The constructs used are adopted from previous studies with modifications done on the market orientation scale to reflect the customer perspective. Each statement was assessed using a five-point scale ranging from '1 = strongly disagree' to '5 = strongly agree'. The 14 item scale had three main elements made up of customer orientation, competitor orientation and inter-functional coordination. Section B of the questionnaire represents managerial attitude towards change and the institution's group culture. Group culture was adapted from the cultural value framework developed by Quinn (1988) and managerial attitude towards change was adapted from Lau and Woodman's (1995) change instrument. Both scales were measured on a five item Likert scale response format. Group culture was represented by three items while managerial attitude towards change by five items. Section C of the questionnaire represents the service quality of the institution consisting of eleven items taken out of the original 22 item SERVQUAL scale developed by Parasuraman, Zeithaml, and Berry (1998). The items were related to services of the institution and were modified to match the study's approach. These scales also used a 5-point Likert type response. Finally, section D of the questionnaire consists of the respondents' background information. This section inquires about the respondents' personal description and academic related questions. In establishing the scale development and validation procedure, the suggestions of Churchill (1979) were followed. Adopting the guidelines outlined by Hair et al. (1998), Exploratory Factor Analysis (EFA) using principal components analysis

and varimax rotation was conducted (Greenley, 1995). Variables with low factor loadings below 0.3 were deleted. Only variables that loaded significantly and greater than 0.3 onto more than one factor were considered. Communalities of the variables, representing the amount of variance accounted for by the factor solution of each variable, were examined. Factors with communalities lower than 0.4 were deleted.

RESULTS

Several inferential statistical tests were conducted. Correlations and simple regression were carried out for the variables and the results were summarized in Table 1, 2, 3 and 4. Table 1 summarizes the results of correlation for antecedent variables which include managerial attitude and group culture. The first dependent variable is market orientation, a mediating variable is service quality and a second dependent variable is customer satisfaction. The results show that all proposed relationships were significant. From the correlation results it was clear that there is a significant positive relationship between managerial attitude towards change and market orientation ($r = 0.281$), group culture and market orientation ($r = 0.365$) as well as market orientation and service quality ($r = 0.287$).

Table 1: Pattern Matrix Illustrating Correlations and Cronbach’s Alpha for the Specific Construct

No	Constructs	1	2	3	4	5	No of Items	Alpha
1	Market Orientation	1.0					14	.89
2	Managerial attitude towards change	.281**	1.0				2	.56
3	Group Culture	.365**	.083	1.0			5	.81
4	Service Quality	.287**	.174*	.303**	1.0		11	.86
5	Satisfaction	.314	.258**	.329**	.331**	1.0	1	

**Significant at 0.01 level (2-tailed), * Significant at 0.05 level (2-tailed), N= 211

Table 2 summarizes the results for correlation between antecedent variables (manager’s attitude and group culture), market orientation elements which are customer orientation, competitor orientation, inter-functional coordination, and service quality. The dependent variable is customer satisfaction. The results show that there is a significant relationship between manager’s attitude and group culture towards market orientation. Manager’s attitude has a positive relationship $r = 0.252$ at a 0.001 confidence level while group culture has a stronger relationship $r = 0.344$ at a 0.001 confidence level toward market orientation. This indicates that the greater the manager’s attitude and group culture, the greater the market orientation of the organization. A composite value of market orientation also showed a positive significant relationship ($r = 0.287$) towards service quality, however its elements depicted some variance. The market orientation elements; customer orientation ($r = 0.221$) and competitor orientation ($r = 0.166$) have a positive significant relationship towards service quality but inter-functional orientation ($r = 0.091$) did not show any significance. This signifies that inter-functional orientation was not significant in developing quality service but customer and competitor orientation were vital in such circumstances. Finally, service quality has a positive significant relationship ($r=0.331$) towards customer satisfaction, thus the greater the service quality, the greater the customer satisfaction

Table 2: Correlation Results on Variables

Construct	Market Orientation	Mediating Variable	Dependent Variable Customer Satisfaction
Manager Attitude	.252***	Service Quality	
Group Culture	.344***		
Market Orientation		.287***	
Customer Orientation		.221***	
Competitor Orientation		.166**	
Interfunctional Coordination		.091(0.239)	
Service Quality			.331***

***Significant at 0.001 level, **significant at 0.05 level

Table 3 indicates regression estimates of the equation: Market orientation = $\alpha + \beta_1$ (managerial attitude) + β_2 (group culture) + β_3 (service quality). The results depicted the value of antecedent variables which are managerial attitude and group culture as well as service quality, a mediating variable. The findings show the adjusted R square of managerial attitude against the market orientation was 0.075, signifying that about 7.5% of changes in market orientation are explained by managerial attitude towards change. At the F value of 25.395, managerial attitude relationship towards the market orientation was significant at the .0001 level, thus Hypothesis 1 was supported. The adjusted R square for group culture against market orientation was 0.129 indicated that nearly thirteen percent of changes in market orientation is significantly explained by group culture. With an F value of 32.058 the group culture relationship toward market orientation was significant at 0.001 confident level. This result shows that group culture has a stronger effect on market orientation compared to other antecedents. Hence, Hypothesis 2 was supported. Finally, the adjusted R square for service quality against market orientation was 0.078 depicting that about 7.8 percent of changes in market orientation are explained by service quality. An F value of 18.815 for the service quality relationship towards market orientation, was significant at the 0.001 level supporting Hypothesis 3.

Table 3: Regression Results of the Antecedents towards Market Orientation

	Adjusted R2	F value
Managerial attitude	0.075	25.395***
Group culture	0.129	32.058***
Service quality	0.078	18.815***

***Significant at 0.001 level

Table 4 summarizes the test results. Hypothesis 1 was supported, showing that more positive managerial attitudes towards change imply a greater market orientation of the institution. Hypothesis 2 was also supported indicating the stronger a group culture, the more market orientated the institution. Hypothesis 3 was also supported showed greater levels of customer-defined market orientation imply greater levels of perceived service quality.

Table 4: Summary of Hypothesis Testing

No.	Variables	Hypothesis Statement	Significance
1	Managerial attitude towards change	The more positive the managerial attitude towards change, the higher the exemplified market orientation of the institutions. (H1)	√
2	Group culture	The stronger the group culture, the more market-oriented the institution. (H2)	√
3	Service Quality	The greater level of customer-defined market orientation, the greater the level of perceived service quality. (H3)	√

This table shows a summary of the hypothesis tests conducted in this paper.

CONCLUDING COMMENTS

This study confirms that organizational group culture and managerial attitude towards change are antecedents of customer-defined market orientation. The findings yielded results similar to Jaworski and Kohli (1993) where top management emphasis was a determinant of market orientation. Responding and taking more risks by the top management were perceived by students as making decisive actions towards becoming more market-oriented. This approach has been the main competitive advantage of many higher education institutions in Malaysia. In regards to academic perspectives, the institution attempts to provide and offer more programs that conform to ever changing market needs. Group culture emphasizes the importance of employee unity, cooperation, and a sense of belonging to the firm, promotes employees' understanding of both the firm and the market, and encourages participation in decision making (Quinn, 1988). Based on our observations, the institution emphasis working together to achieve

objectives and targets as a team was the main strategy adopted by this institution. With its aggressive and committed workforce each employee is accountable to the institution. The institution was also committed to creating a harmonized working relationship among its employees and as part of its organizational culture.

The findings of this study show evidence of a positive association among customer-defined market orientation and perceived service quality. It corroborates the findings of Webb et. al, (2000). Market-orientation, as an overall organizational value provision system, influences the behavioural norms and shaped the organization's attributes and delivery behaviour. This has an impact on both service quality and customer satisfaction. However, an interesting notion was derived from this study. Specifically, an average level of "market orientation" was perceived by the students. This accentuates the argument of Bailey and Dangerfield (2000) that being market oriented should not lead academic institutions to become customer led which addresses student immediate and expressed wants and needs as this approach creates several interrelated problems. Hence, although student evaluations of the programs were average, the impact of the courses could only be realized when they excel in their later careers.

The overall results demonstrate that market orientation, particularly an organizational culture, influences the behavioural norms that shape an organization attributes and delivery behaviour. Being a market oriented institution warrants that the firm delivers a quality service in compliance with the needs or requirements of customers. Consequently, this would lead to customer satisfaction based on the quality of services rendered. The findings illustrate that management may be able to influence customer satisfaction and service quality by adopting and implementing a market-oriented culture. The findings also attest the significance of each of the dimensions of market orientation. The results exhibit the ordering of standardized coefficients in terms of importance. It is evident that customers are able to observe if the firm has an emphasis on customers or competitors. Finally, this study accentuates our earlier argument that customer satisfaction is derived from value delivered by the level of service from being market oriented. In conclusion, this study has provides insight into market orientation of non-profit institutions, service quality and the customer satisfaction relationship.

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