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IT service climate, antecedents and IT service quality outcomes: Some initial evidence

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ABSTRACT

Although many IT service management frameworks exist, we still have limited theoretical understanding of IT service quality within a broader nomological network. Building on recent conceptual work on the IT service climate construct, this study empirically establishes it as a predictor of IT service quality using survey data from both IT units and their clients. Also examined was a set of antecedents which provide a foundation upon which a favorable service climate can be built. The IT service climate instrument, when incorporated into employee feedback initiatives, can provide guidance to IT executives about practices to improve service quality.

1. Introduction

As the interdisciplinary area of Service Management and Engineering has matured in recent years, researchers from diverse backgrounds such as computer science, cognitive science, engineering, information technology, organizational behavior, human resources management, marketing and operations research have contributed to our understanding of service.

Within the information technology (IT) literature, the notion of IT service has traditionally been described as a human-mediated service delivered by IT personnel to business clients (e.g., Kettinger and Lee, 2005; Pitt et al., 1995). As the Internet became a dominant platform for business transactions, the notion of IT service has been expanded to include both software as a service and online self-service without direct human intervention (Tate and Evermann, 2010). The research reported here is concerned only with service to business clients that is mediated by IT personnel. The concept of IT service climate presented herein has greater relevance with such human-mediated service. The latter two types of services are likely to require quite different models in assessing their quality.

IT now permeates most business processes within and across organizations, and IT departments are seeking ways to identify, measure and improve the services they provide to their clients. In the research literature, IT departments have long been viewed as service providers, and service quality has been a topic of interest for many years (e.g. Kettinger and Lee, 1994). One stream of this literature, largely rooted in the traditional notion of human-mediated IT service, has identified IT service quality as one of the three pillars of IT success along with information quality and systems quality (DeLone and McLean, 2003; Pitt et al., 1995). Recent empirical evidence found that IT service quality was more strongly associated with desired

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organizational outcomes than was information quality or systems quality, leading to the conclusion that managers aiming to achieve the greatest organizational impact should set a high priority on IT service quality (Gorla et al., 2010).

Despite its potential for significant organizational impact, our understanding of the IT service quality phenomenon remains limited as much of the past work has focused on developing the service quality construct and measurement instrument (e.g., Jiang et al., 2002; Klein et al., 2009; Kettinger and Lee, 1994, 2005; Pitt et al., 1995), most notably ServQual (e.g. Pitt et al., 1995).

However, in addition to identifying a service shortfall (the "*what*"), IT managers also need to find the root causes (the "*why*") and choose appropriate corrective actions (the "*how*"). For example, a perceived lack of responsiveness may have several sources, such as lack of service orientation, lack of resources, or lack of expertise (Jia and Reich, 2008). Thus, managers need tools to complement measures of service quality; instruments to measure the service-related factors within the IT function that can pinpoint causes of service shortfalls. This study aims to offer one such tool.

In the organizational climate theory literature, seminal research on service climate in the retail banking context (e.g., Schneider and Bowen, 1985; Schneider et al., 1980, 1996, 1998) has demonstrated a strong relationship between service climate and service quality. Recent research extending that literature to the IT service context suggests a new construct, *IT service climate*, as a predictor of IT service quality, and posits several antecedent variables of IT service climate based in theory and literature (Jia and Reich, 2008).

Continuing that program of research, the current study represents an initial step toward validating the IT service climate construct and empirically assessing its relationships with IT service quality and antecedent variables in its nomological network. Establishing IT service climate as a predictor of IT service quality can expand the scope of IT service quality research beyond measurement to prediction; the nomological net extending from antecedent conditions through service climate to service quality.

The IT service climate theory and instrument developed in this study will contribute to IT services management practice as an important diagnostic tool for managers. An understanding of antecedent conditions and the dimensions of IT service climate, will help managers develop appropriate organizational interventions to enhance customer service and achieve stronger IT alignment.

The rest of the paper is organized as follows. We first summarize the relevant literature and present research hypotheses. We then present the four steps involved in construct validation and report the results of hypothesis testing. The paper concludes with a discussion of its contributions to research and practice.

2. Literature review

In this section, we summarize the literature in the two areas which underpin this research: service quality and service climate. Both areas are first discussed generally and then in an IT context.

2.1. Service, service quality and IT service quality

In the service marketing literature, services were traditionally distinguished from goods as having four unique characteristics, i.e., intangibility, heterogeneity, inseparability, and perishability (e.g., Zeithaml et al., 1985). As goods become more service-like (Grönroos, 2006), recent conceptualizations have advocated a more inclusive view of service (e.g., Lovelock and Gummesson, 2004; Edvardsson et al., 2005). For example, Vargo and Lusch (2004) argued for a service-dominant view of all exchange, defining service as "the application of specialized competences (skills and knowledge), through deeds, processes, and performances for the benefit of another entity or the entity itself (self-service)."

The concept of service quality, defined as the consumer's overall impression of the relative inferiority/superiority of the service (Zeithaml, 1988), was first conceptualized as a customer perception by Grönroos (1982), and then extended to the gap model and the associated ServQual instrument (Parasuraman et al., 1988) and other related extensions (e.g., Cronin and Taylor, 1992). Despite the many critiques regarding its dimensions, measurement approaches and applicability in different service contexts (e.g., Carman, 1990; Cronin and Taylor, 1992, 1994; Parasuraman et al., 1991, 1993; Teas, 1993, 1994; Tate and Evermann, 2010; Van Dyke et al., 1997), the ServQual instrument has remained the most popular measure of service quality (Zeithaml, 2000).

IT researchers have adopted an expansive view of IT service from IT departments; from hardware and software selection and installation, systems development and maintenance, to helpdesk, network, web design, and training (Kettinger and Lee, 2005; Pitt et al., 1995). The IT-ServQual instrument (Kettinger and Lee, 1994; Pitt et al., 1995), consisting of four dimensions (i.e., reliability, responsiveness, assurance and empathy), has been widely used to measure the quality of service IT departments provide to business users (e.g., Gorla et al., 2010; Jiang et al., 2002; Kettinger and Lee, 2005; Kettinger et al., 1995; Watson et al., 1998).

Though in other contexts, the notion of IT service may refer to the service science conceptualization of software as a service, or online self-service without direct human interaction (Tate and Evermann, 2010), this study uses business clients as informants and focuses on the human-mediated service delivered to them by IT personnel. This is in keeping with the focus of the prior IT service quality literature and is "a relatively unproblematic application of the original ServQual concepts" (Tate and Evermann, 2010, p. 61).

2.2. Climate and service climate

Organizational climate has been defined as "the shared perceptions of employees concerning the practices, procedures, and kinds of behaviors that get rewarded and supported in a particular setting" (Schneider, 1990, p. 384), or simply, the shared perceptions of "the ways things are around here" (Reichers and Schneider, 1990, p. 22). Because these perceptions in turn guide behavior, climate is a mediator between the work environment and employee behavior (Kopelman et al., 1990).

It is important to distinguish organizational climate from organizational culture, which is a related, but distinct construct. The term culture is often used when climate is the more appropriate term (Schein, 2000). Climate is about experiential descriptions or perceptions of what happens and can be understood as a manifestation of culture, which is a deeper phenomenon based on core values and fundamental assumptions (Schein, 1985, 1992).

Climate is best viewed as a construct with a strategic focus – a climate must be a climate *for something* (Schneider, 1975). Various types of strategic climates have been investigated in the IT literature. Recent work includes climate for IT innovation (Watts and Henderson, 2006), ethical climate of IT professionals (Iacovou et al., 2009), communication climate in outsourced projects (Rai et al., 2009), climate for knowledge-sharing (Kankanhalli et al., 2005), supply chain channel climate (Patnayakuni et al., 2006), and climate for user participation (He and King, 2008). In the broader literature, service climate is probably the strategic climate that has received the most attention. Cumulative research in this area has established service climate as a predictor of service quality (e.g., Schneider and Bowen, 1985; Schneider et al., 1980, 1996, 1998). In Schneider et al.'s (1998) original conceptualization of service climate, the construct includes dimensions such as managerial practices, customer feedback, and customer orientation (Table 1).

2.3. IT service climate

Schneider et al.'s (1998) original service climate dimensions are likely to be relevant in the IT service context. However, unlike many other service providers, IT employees provide services to internal customers, and the services often involve complex knowledge work (Schultze, 2000). The definition of IT service climate adopted herein is first presented in Jia and Reich (2008); namely, *IT professionals' shared perceptions of the practices and behaviors in their workplace that support the provision of IT service to business customers*.

To assess the extent to which Schneider et al.'s dimensions apply in the IT service context, and to uncover any new potential dimensions, Jia and Reich (2008) conducted an extensive review of organizational climate literature, service marketing literature, and related work on business–IT relationships to develop a set of dimensions for the IT service climate construct. The review resulted in a four-factor conceptualization of the IT service climate construct, including Service Leadership, Service Vision, Client Feedback and Client Communication. Their definitions and theoretical and literature support are summarized in Table 2. Note that Schneider's dimensions of managerial practices and customer orientation have been

Table 1
Schneider et al.'s (1998) service climate dimensions in the banking context.

Dimensions	Definitions
Managerial practices	Actions taken by an employee's immediate manager to guide and reward the delivery of quality service (e.g., goal setting, work planning, coordination, recognition and rewards)
Customer orientation	The degree to which meeting customer needs and expectations for service quality is emphasized
Customer feedback	The practice of soliciting and using feedback from clients regarding service quality
Global service climate	A summary measure for overall perceptions of service climate

Table 2
IT service climate dimensions and definitions (Jia and Reich, 2008).

Dimension	Definition	Relevant theory	IT literature support
Service Leadership	The extent to which IT managers take actions to guide the delivery of quality service	Goal setting theory, expectancy theory, path-goal theory of leadership	Abdel-Hamid et al. (1999) and Boehm (1981)
Service Vision	The extent to which meeting client needs, demonstrating flexibility, and establishing communication are emphasized	Role theory	Markus and Benjamin (1996) and Chan and Reich (2007)
Client Feedback	The extent to which feedback from clients regarding service quality is solicited and addressed	Job characteristics theory	Abdel-Hamid et al. (1999), Dennis and Kinney (1998), Ferratt and Short (1988) and Kraut et al. (1982)
Client Communication	The extent to which there exists an emphasis on open and frequent communication with clients regarding task-related issues	Work climate theory (Jones and James, 1979)	Boynton et al. (1994), Brown (1999), Brown and Chervany (1995), Caron et al. (1994), Markus and Benjamin (1996) and Roepke et al. (2000)

renamed as service leadership and service vision for greater clarity in the IT context. Additionally, customer communication, a construct extensively studied in the organizational climate and the IT literature but missing from Schneider and colleagues' conceptualization, was added.

Climate constructs can be defined at different levels of analysis (Chan, 1998; James, 1982; Ostroff et al., 2003). This research develops the IT service climate instrument at the level of the IT unit, defined as a subunit within the IT department that has a "specific management structure in place, serving a single business client unit" (Nelson and Cooprider, 1996). An example would be an IT unit that develops and supports one or more applications for a single business unit.

3. The research model

Fig. 1 presents the research model linking service climate and its antecedent and outcome variables. Some of these relationships have been more comprehensively discussed in our earlier conceptual work (Jia and Reich, 2008) and are summarized here to provide the theoretical foundation for the empirical testing. Relationships depicted in Fig. 1 are supported by relevant literature and derived as hypotheses below.

3.1. IT service climate and service quality

Cumulative work by Schneider and colleagues found that bank branches whose employees rated the service climate at their branch favorably were the same branches whose customers positively assessed the service quality they received (Schneider and Bowen, 1985; Schneider et al., 1980, 1996). In addition, changes in employees' service climate perceptions preceded changes in customer satisfaction (Schneider et al., 1996). Studies in other service contexts and using other measures of service outcomes (e.g., de Jong et al., 2005; Grizzle et al., 2009; Liao and Chuang, 2007; Mayer et al., 2009; Salanova et al., 2005; Schneider et al., 2005) also supported the predicted linkage between service climate and service quality. Thus, a positive relationship is hypothesized between an IT unit's service climate and its service behavior, i.e., the IT service quality experienced by business customers.

H1. The level of service climate in an IT unit is positively related to the quality of service provided to its business client unit.

Note that other factors, such as IT professionals' technical competency, may also impact the quality of IT service experienced by business clients, and thus need to be controlled when testing the hypothesized relationship.

3.2. IT service climate antecedents

Although research on the antecedents of climate has been limited (Ostroff et al., 2003), one set of variables that has received some attention focuses on social interactions in the workplace, particularly organizational and leadership practices such as supervisory work facilitation and support (e.g., Kozlowski and Hults, 1987; Schneider and Bowen, 1993; Schneider et al., 1998) and interdepartmental support (Schneider et al., 1998).

Work on organizational support often takes a social exchange theory perspective (Blau, 1964), where the receipt of organizational support by an employee prompts a sense of obligation to reciprocate and support organizational goals (Eisenberger et al., 1997). Research found that differences in organizational support perceived by IT workers, related to their work performance (Ang and Slaughter, 2001).

In thinking about organizational support as an antecedent to IT service climate, we followed prior research (e.g., Goldstein and Rockart, 1984; Susskind et al., 2003) and distinguished between supervisor and coworker support (Jia and Reich, 2008). These two elements are discussed below.

3.2.1. Supervisory support

Supervisory support is defined as general efforts made by managers to facilitate employees in their work and provide assistance (Schneider et al., 1998; Susskind et al., 2003). Also referred to as managerial support or work facilitation

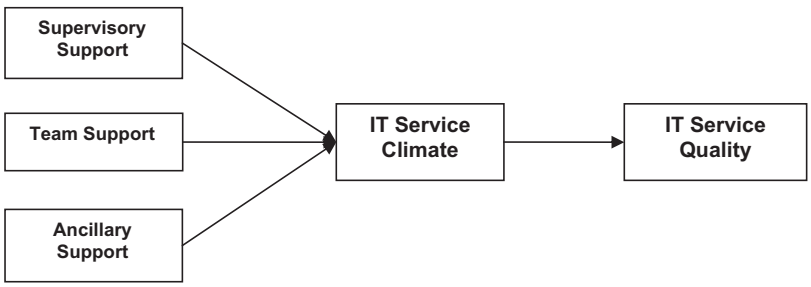

Fig. 1. Research model.

(Schneider et al., 1998), it has been found to be an antecedent of service climate (Schneider et al., 1998). In the IT literature, it has also been shown to reduce IT professionals' role ambiguity and role conflict (Goldstein and Rockart, 1984), which in the context of IT service, are related to IT professionals' service role orientation.

H2. The level of supervisory support an IT unit receives is positively related to the level of IT service climate in the unit.

One potential issue with the above relationship is that supervisory support may be conceptually similar to the Service Leadership dimension of the climate construct since the former refers to managers' general efforts while the latter is related to specific managerial actions to guide the delivery of service (e.g., setting goals). In Schneider et al.'s (1998) test of a causal relationship between the two, the linkage between service climate and supervisory work facilitation has been characterized as "a figure resting on a general background," where supervisory work facilitation acts as a foundation for a favorable service climate. Though no discriminant analysis was reported in their study, the metaphor makes intuitive sense. We realize that conceptually distinctive constructs may not be empirically distinguishable and will examine their relationship in the IT service context and conduct a discriminant analysis.

3.2.2. Coworker support

Coworker support refers to cooperative peer-level effort amongst employees to provide work-related assistance to aid in the execution of their tasks (Susskind et al., 2003). Coworker support is important in the IT context because IT work is often team-based and requires peer cooperation and collaboration (Jia and Reich, 2008). Peer support can reduce IT professionals' role ambiguity and role conflict (e.g., Goldstein and Rockart, 1984), which are related to IT professionals' service vision. Helping behavior among IT employees is also likely to spill over to helping customers. Thus, coworker support provides a foundation upon which to build a favorable IT service climate (Jia and Reich, 2008).

In this study, since the level of analysis is the IT unit, we further distinguish between two types of coworker support – team support and ancillary support. The former refers to the kind of support between members within the IT unit, and the latter refers to the support and cooperation an IT unit receives from other units *within* the IT department.

Ancillary support is a phenomenon that has not received much attention in IT research. Schneider et al. (1998) investigated interdepartmental service (e.g., support from marketing and HR departments of a bank to retail branches) as a type of internal support necessary to create a favorable service climate. Though IT units typically do not need task support from other organizational departments, their work sometimes does rely on the cooperation and support from the rest of the IT organization. For example, systems development units often need cooperation from operations units that manage infrastructure or corporate data administration. In sum, team support and ancillary support are hypothesized as antecedents of IT service climate.

H3. The level of team support in the IT unit is positively related to the level of IT service climate in the unit.

H4. The level of ancillary support available to the IT unit is positively related to the level of IT service climate in the unit.

In the following sections, the IT service climate instrument development and testing process is presented, followed by discussions of hypothesis test results.

4. Construct validation

Following guidelines in the literature (e.g., Churchill, 1979; Moore and Benbasat, 1991), construct validation was carried out in four stages: item generation, scale development, pilot test, and field test. Each stage is described below.

4.1. Item generation

The major tasks in Stage 1 were to generate a pool of candidate items and assess their content validity, i.e., the extent to which scale items appear to be consistent with the theoretical domain/dimensionality of the construct (Churchill, 1979; Cronbach, 1971). These tasks were accomplished through literature review, in-depth field interviews, and content reviews by IT academics and practitioners.

4.1.1. Literature review

Review of organizational climate and service marketing literature as well as related work on business–IT relationships described in an earlier section, sought to identify candidate measurement items. Because little prior IT climate research was conducted in the context of IT service, the literature review was complemented by field interviews to generate any new items necessary to ensure domain coverage and to establish content validity.

4.1.2. Field interviews

Twelve semi-structured interviews were conducted with IT systems analysts, managers and executives from four organizations, representing telecommunication, insurance, banking and media industries. The interviews each lasted 1–2½ h and used open-ended probes such as, "What are the factors in the IT department that have an impact on the quality of service

provided to its clients?" Interviewees received questions in advance so that they had an opportunity to reflect on these issues (Jia and Reich, 2008). Overall, the interviewees found the IT service climate construct appealing and readily applicable to the IT service context.

Interview data supported the dimensions proposed by Jia and Reich (2008) seen in Table 2, but also suggested one adjustment to the Service Leadership dimension. The Service Leadership dimension included three types of leader behaviors: goal setting, work coordination and planning, and recognition and reward. Interview data revealed that although aligning IT personnel evaluation with its service outcomes (recognition and reward) is widely viewed as critical, it is often not consistently practiced and is seen as different from the other two types of day-to-day leadership behaviors (i.e., goal setting, work coordination and planning). In addition, in many participating organizations, while IT managers emphasize the importance of client service, the employee performance evaluation structure may favor technical excellence. Given these considerations, it was decided that Service Evaluation be developed as a separate IT service climate dimension, defined as the extent to which the evaluation of IT professionals is linked with service performance.

Based on the literature review and field interviews, an initial pool of 65 items was constructed in five IT service climate scales: Service Leadership, Service Vision, Client Communication, Client Feedback, and Service Evaluation.

4.1.3. Content validation

Two organizational psychology researchers and four IT practitioners performed content validation. Items that were either ambiguous (fitting in more than one category), indeterminate (fitting in no category), or redundant (overlaps between items) were revised or eliminated (Moore and Benbasat, 1991), resulting in a refined pool of 50 items. Each item was a statement asking respondents for a degree of agreement or disagreement using a seven-point Likert scale. The next stage in the instrument validation process was scale development.

4.2. Scale development

The goal of this stage was to assess the dimensionality of the various climate scales being developed (Moore and Benbasat, 1991). Judges were asked to sort the candidate items into construct categories following Davis (1989) and Moore and Benbasat's (1991) procedures. Three rounds of sorting were carried out, using a pair of new judges in each round. The evolution of these scales through the sorting exercise is summarized in Table 3.

Though we cannot report results from each sort in detail, one adjustment to construct dimensionality during the sorting exercise is noteworthy. As recommended independently by the two judges in the second sort, the Client Communication and Client Feedback scales were combined, because both types of IT–client interactions (task-related interactions vs. feedback solicitation) are in the broad category of communication and are likely to be highly correlated (and thus lack discriminant validity). Since Client Communication can be more broadly defined to incorporate client feedback solicitation, they were combined for discriminant validity and parsimony.

Also interesting were the results from the third round, which followed Moore and Benbasat's (1991) "blind sort" procedure. The rationale for arranging the blind sort in later rounds was that the blind sort is a relatively unstructured exercise, and therefore may require many additional rounds if the item pool had not been purified in earlier more structured sorts, where construct labels were provided. During the third round, while one judge identified four dimensions from the item pool, created labels for them that are consistent with the proposed four dimensions, and also correctly placed all items, the other judge identified three latent dimensions, including a "service orientation" scale with items from the proposed Service Vision and Client Communication scales combined, and reasoned that a service-oriented IT organization will necessarily emphasize communication with clients, thus they should be combined. A decision was made to not combine the two scales at this stage because the decision could be informed by empirical data from later stages. (High correlations between items from these two scales would suggest low discriminant validity between them and support their combination.) Results from both judges in the third sort also supported the earlier decision not to develop Client Feedback as a separate dimension.

The sorting procedure resulted in a 23-item instrument consisting of four scales: Service Leadership, Service Vision, Client Communication, and Service Evaluation (Table 4). The fact that items had been placed satisfactorily within these scales provided initial evidence for construct validity (Moore and Benbasat, 1991). The issue of whether to develop Service Vision and Client Communication separately was left to be resolved through the pilot test.

Table 3
The IT service climate scales during scale development.

Scale	First sort	Second Sort	Third sort
Service Leadership	9	7	6
Service Vision	16	10	7
Client Communication	6	8	6
Client Feedback	5	No longer developed	
Service Evaluation	5	5	4
Total	41	30	23

Table 4
IT service climate scales for the pilot test.

Scale	Item	
Service Leadership	lead1[a]	My unit manager clearly states his/her expectations to us regarding what is good work and service
	lead2	My unit manager spends time on planning and coordinating our work and service
	lead3[a]	My unit manager constantly tracks our service performance (e.g., schedule, budget, quality)
	lead4	My unit manager regularly discusses work performance goals with us
	lead5	My unit manager frequently talks to us about how our service contributes to better performance of our clients
	lead6	My unit manager discusses with us the best approaches to serve our clients
Service Vision	vis1	In my unit's daily work, there is an emphasis on providing excellent service to our business clients
	vis2	My unit often suggests new ways to solve business problems
	vis3	There has been true effort in our unit to establish ourselves as a respected partner of our clients
	vis4[a]	My unit actively participates in client unit activities (e.g., business and product planning)
	vis5[a]	People in my unit know how to disagree with clients in a professional manner
	vis6[a]	People in my unit can quickly adapt to changes in our clients' requirements
	vis7	People in my unit are flexible when dealing with clients' perspectives
Client Communication[a]	com1[a]	My unit works at keeping our clients informed of the systems and technology changes that affect them
	com2[a]	There is no communication barrier between my unit and our clients
	com3	My unit frequently shares information with clients
	com4[a]	Communicating and sharing information with clients are highly emphasized in my unit
	com5[a]	My unit clearly communicates to business clients what they can realistically expect from us
	com6	My unit actively solicits comments and feedback from clients
Service Evaluation	eval1	We receive recognition and reward for providing excellent service to our clients
	eval2	Our compensation is linked to client evaluations of our service performance
	eval3	In my most recent performance review, I was evaluated on how well I served the clients
	eval4	Customer service is an important criterion of our formal performance evaluation

[a] Item/dimension dropped after the pilot test.

4.3. Pilot test

The pilot questionnaire was administered to systems employees of a local organization, and 32 useable responses were received. In keeping with prior research on unit-level climates (e.g., Anderson and West, 1998; Schneider et al., 1998), the new instrument's reliability and construct validity were assessed at the individual level.

Though the pilot sample was not large enough for an overall exploratory factor analysis (EFA) that includes all four scales, it was sufficient to perform separate EFA runs for each scale with about five observations for each item (Hair et al., 2006). Items loaded onto one factor in each of the four separate runs, providing initial evidence of scale convergent validity. Several items were eliminated to reduce redundancy and enhance convergent validity.

Regarding the pending issue from the third round of sorting, i.e., whether a three-factor model (with Service Vision and Client Communication combined) better represented the IT service climate construct, we examined the inter-item correlation matrix, which indicated that the two sets of items were highly correlated (all coefficients were greater than 0.7, and some over 0.8), suggesting some significant overlap between them. (In an additional EFA run for this pair of scales with their items combined – though the pilot sample size may be a constraint for such analysis – all items loaded onto a single factor.) Thus, there was sufficient support for collapsing Client Communication into the Service Vision scale. This combination was not surprising since, as argued by a third-sort judge who proposed their combination, an IT organization with a strong vision for service will necessarily emphasize client communication. In other words, client communication is reflective of Service Vision, which is a first-order reflective construct. These adjustments to climate dimensions, uncovered through the empirical stages of construct validation, were not unexpected, since the initial dimensions were developed based on theory and prior literature.

Additional items were eliminated based on their inter-item correlations to ensure discriminant validity of the scales being developed. Throughout the culling process, we ensured that the domain coverage of the construct dimensions would not suffer as a result. The resulting IT service climate instrument from the pilot test, as shown in Appendix A, consisted of 14 items from three scales: Service Leadership, Service Vision and Service Evaluation, all achieving composite reliability of over 0.7. The instrument was then subject to a final validation.

4.4. Field test

Four organizations, including two insurance companies, a government agency, and a manufacturing company, provided data for both instrument validation and hypothesis testing. In each organization, a contact person helped to identify dyads of IT units and their client units. All participating IT units were responsible for system development, enhancement and maintenance.[1] Their respective client units came from various functional areas, such as finance and human resources.

[1] Within the four participating organizations, the primary IT service type provided was traditional human-mediated service such as application development and maintenance, network support and training. In three of the organizations, online self-service was also provided to external customers.

Table 5
Participants in the final data collection.

Company	IT systems employees	IT survey responses	Client survey responses
Government agency	130	51	22
Insurance company A	200	91	41
Insurance company B	140	77	59
Manufacturer[a]	56	11	–
Total		230	122

[a] Due to unanticipated availability issues at the time of survey administration, the manufacturing company did not participate in the client survey, and only one systems unit took part in the IT survey.

Table 6
IT and client units in the hypothesis tests.

Company	IT–client paired units	Responses from IT units	Responses from client units
Government agency	6	36	22
Insurance company A	14	84	40
Insurance company B	19	72	59
Total	39	192	121

Two surveys were distributed in each of the participating companies. The IT survey, consisting of items to measure IT service climate, its antecedents, and IT technical competence as a control variable, was distributed to all employees in the participating IT units. The client survey, consisting of the four-dimension IT-ServQual instrument (Pitt et al., 1995), was distributed to five or six members of each client unit who frequently interacted with members of their respective IT unit. (See Appendix for all IT and client survey items.) Each copy of the two surveys included a unique identifier, which was used to identify the respondent's unit membership after the questionnaire was returned.

4.4.1. Survey respondents

A total of 230 completed responses to the IT survey and 122 completed responses to the client survey were received (Table 5). Due to unanticipated availability issues at the time of survey administration, the manufacturing company did not participate in the client survey, and its employees from only one systems unit took part in the IT survey.

Based on the unique identifier on each questionnaire, which indicated from which IT or client unit it was returned, 39 matched pairs of IT–client units were identified, with at least three responses from an IT unit and at least two responses from each client unit. These 39 matched pairs represented 192 IT responses and 121 client responses (Table 6). The average number of responses is 4.9 per IT unit and 3.1 per client unit.

The 230 IT responses formed the sample for instrument validation, and data from the 39 matched pairs of IT and client units were used in hypothesis testing. Confirmatory factor analysis results are discussed next.

4.4.2. Confirmatory factor analysis

Because "service climate is inferred based on the presence of parts relevant for service" (Schneider et al., 2000), the relationship between the IT service climate construct and its dimensions is formative and causal. Because it can be onerous to use LISREL or PLS-Graph to directly factor-analyze a multidimensional formative construct (Gefen et al., 2000; Petter et al., 2007), we followed Yi and Davis' (2003) approach to directly evaluate a decomposed model of three IT service climate dimensions (see Fig. 2d). Since this decomposed model only contains first-order reflective constructs, it can be assessed by either LISREL or PLS-Graph. Because LISREL produces a comprehensive set of goodness-of-fit indices, it was chosen in this study.

Overall model fit. Goodness-of-fit of three alternative models (Figs. 2a–c) in relation to the hypothesized model (Fig. 2d) was calculated. As shown in Table 7, all three alternative models have poor fit against the recommended thresholds, and only the hypothesized model demonstrated satisfactory overall fit.

A final set of 10 items, as shown in Appendix A, was retained after four items were eliminated for low factor loadings based on recommended thresholds (i.e., 0.71 excellent, 0.63 very good, 0.55 good, 0.45 fair and 0.32 poor; Tabachnick and Fidell, 2007). The retained items ensured domain coverage, and all have loadings significant at .001. Parameter estimates in this model are shown in Fig. 3.

Convergent validity. Since all items loaded onto their respective factors and all path coefficients were significant ($p = .001$), Segars' (1997) guideline for convergent validity was met.

Discriminant validity. Pairwise LISREL models were tested, where each model was run twice (constrained vs. unconstrained). Results in Table 8 show that the unconstrained models have significantly lower χ^2 values and thus better fit in all cases. Similar results were obtained when involving all three scales in the test ($\Delta\chi^2 = 243.16$, $p = .000$). The above provided evidence for discriminant validity of the instrument. However, this support needs to be tempered by the presence

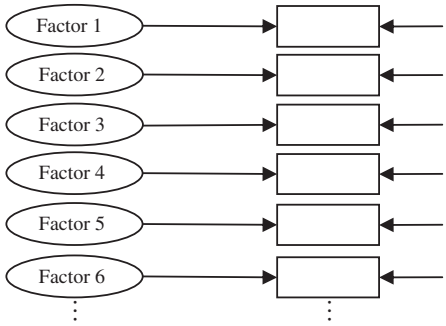

Fig. 2a. Model 1: Null.

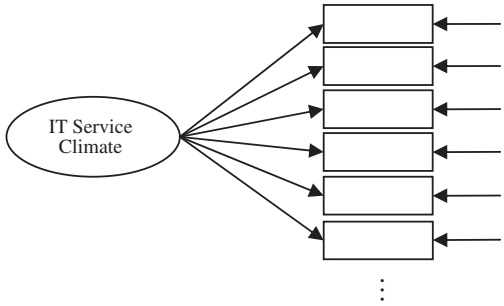

Fig. 2b. Model 2: One first-order factor.

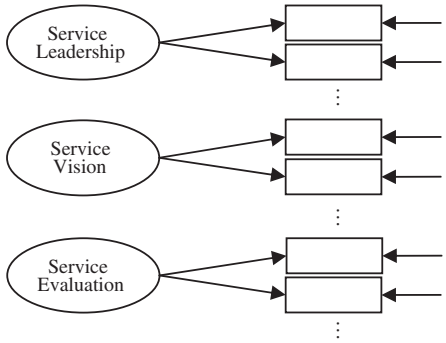

Fig. 2c. Model 3: Uncorrelated three factors.

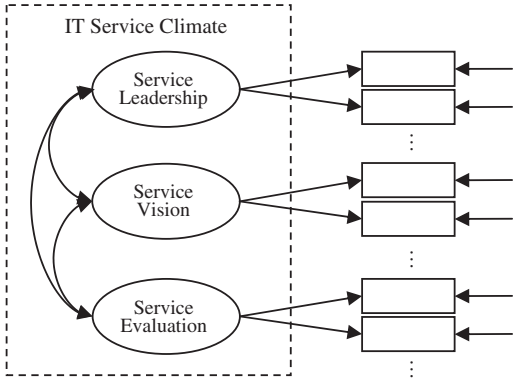

Fig. 2d. Model 4: Correlated three factors.

of cross loadings (Appendix B). We concluded that, as a new measurement instrument the climate scales possess acceptable discriminant validity, and that they should be refined in future research (acknowledging that items may be fine and cross-loadings could to some extent be an artifact of the approach).

Reliability. These scales also demonstrated adequate reliability for new measures with Cronbach's alpha values at 0.81 for Service Leadership, 0.85 for Service Vision, and 0.68 for Service Evaluation (Nunnally, 1967). Because reliability is not relevant for a formative construct (Petter et al., 2007), it is not reported for the overall climate instrument.

In summary, the IT service climate instrument demonstrated adequate reliability and factorial validity. This is the first step in creating a construct instrument upon which future refinements can build. We next assess the extent to which it can explain variance in IT service quality (i.e., criterion validity) and its relationships with the three hypothesized antecedents.

5. Hypothesis test results

As discussed earlier, the IT survey included the service climate scales and measures for technical competency and the three organizational support variables. (See items and factor loadings in Appendices A and B.) The client survey included the four-dimension IT-ServQual instrument, and service quality rating was calculated as a gap score (Pitt et al., 1995).

Table 7
Goodness-of-fit tests of alternative models (n = 230).

Criteria	Threshold	Model 1 Null	Model 2 One first-order factor	Model 3 Three uncorrelated first-order factors	Model 4 Three correlated first-order factors
χ^2		1339.42	500.64	424.32	177.48
d.f.		77	77	77	74
χ^2/*d.f.*	(<3.00)[a]	17.40	6.50	5.51	2.40
RMSEA	(<0.08)[a]	0.26	0.15	0.14	0.08
CFI	(>0.90)[b]	0.00	0.93	0.92	0.98
NFI	(>0.90)[b]	0.00	0.92	0.90	0.96
GFI	(>0.90)[b]	0.36	0.77	0.80	0.91
AGFI	(>0.80)[c]	0.13	0.69	0.73	0.87

[a] Hair et al. (2006).
[b] Bollen (1989) and Hu and Bentler (1995).
[c] Morgan and Hunt (1994).

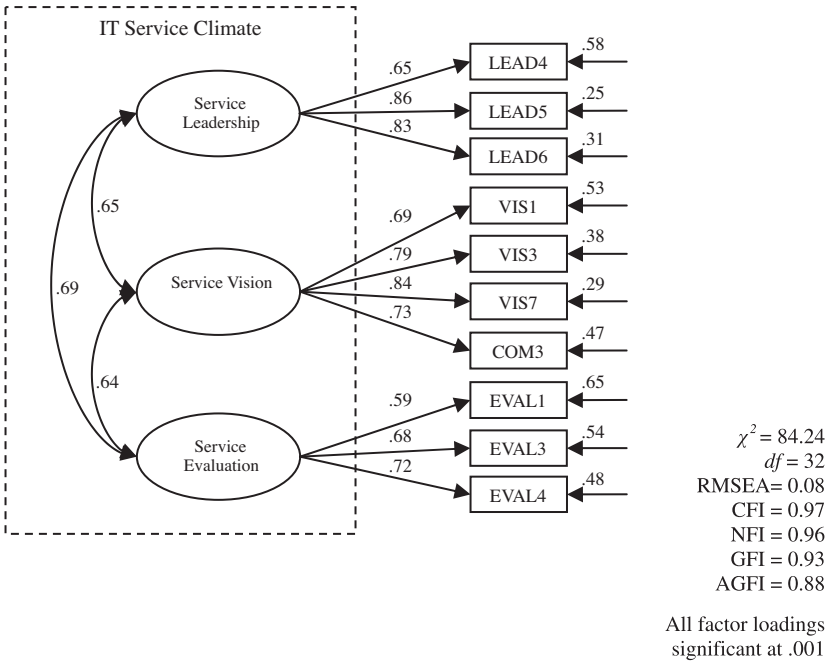

Fig. 3. Parameter estimates (Model 4, n = 230).

Table 8
Discriminant validity of the three first-order factors ($n = 230$).

Construct pair	Constrained model χ^2 (*d.f.*)	Unconstrained model χ^2 (*d.f.*)	$\Delta\chi^2$
Service Vision–Service Leadership	183.70 (14)	36.62 (13)	147.08***
Service Vision–Service Evaluation	99.45 (14)	56.60 (13)	42.85***
Service Leadership–Service Evaluation	50.51 (9)	29.67 (8)	20.84***

*** $p < .001$.

To examine climate at the unit level, one must provide evidence of a high level of "sharedness" in cognition among individual climate perceptions within the unit (James et al., 1984). In other words, it is necessary to ensure intra-unit agreement across individual service climate scores (calculated by averaging the three climate dimension ratings). Table 9 provides values for the multi-item within-group agreement statistic, $r_{WG(J)}$ (James, 1982), calculated to justify the aggregation of individual-level data before unit-level relationships could be assessed. The statistics for the 39 IT units' service climate, technical competency and organizational support variables all met the 0.60 threshold (James, 1982). The average $r_{WG(J)}$ score for the IT service quality ratings from the 39 client units was also a satisfactory 0.76, with only two units below 0.60,[2] thus justifying data aggregation. Individual responses were then averaged to obtain unit scores. Descriptive statistics and the correlation matrix are presented in Table 9.

Though LISREL was available to validate the IT service climate construct ($n = 230$ individual IT responses), the aggregated unit-level sample size ($n = 39$ matched pairs of IT–client units) did not permit the use of an SEM technique.[3] Hierarchical regression was thus used for hypothesis testing as it can also parcel out the effects of other variables on the criterion variable. Though regression could not offer the convenience of a simultaneous test of the full model, it was deemed an adequate analytical tool for this study because in the context of small sample sizes, PLS is not superior to regression, and the similarities in results between regression and PLS/LISREL are "much stronger than the differences" (Goodhue et al., 2012).

5.1. IT service quality outcome (H1)

Results in Table 10 show that after controlling for the systematic differences across the participating organizations (Step 1), technical competency has a significant impact on IT service quality (Step 2, $t = 3.125$, $p = .004$). After parceling out effects of technical competency, IT service climate demonstrated a significant relationship with IT service quality (Step 3, $t = 7.073$, $p = .000$). Thus, H1 is supported.

5.2. Climate antecedents (H2–H4)

Similar regression equations were estimated to establish supervisory support, team support and ancillary support as antecedents of IT service climate. Results in Table 11 suggest that, after controlling for the organization (Step 1), each of the three variables is significantly related to IT service climate in the respective equations (Step 2), thus supporting H2, H3 and H4. Though there is potential for common method variance in the tests above, it is unlikely a major threat given the presence of low or moderate correlation coefficients (Table 9).

When all three variables were entered into one equation, the effect of ancillary support became nonsignificant ($p = .814$, *n.s.*) while supervisory support ($t = 5.84$, $p = .000$) and team support ($t = 2.23$, $p = .032$) remained significant.

As anticipated, supervisory support cross-loaded with the Service Leadership dimension (Appendix B). However, items loaded most highly on the intended factors, and in a Chi-square discriminant analysis, supervisory support was statistically distinct from Service Leadership ($\Delta\chi^2 = 5.19$, $p < .05$). Future research may consider using a different measure for supervisory support.

5.3. IT service climate as a mediator

Since H1–H4 imply that IT professionals' service climate perception is the mediator between characteristics of the IT work setting and their service outcome, a hierarchical regression model was estimated to assess the nature of the mediation (i.e., full or partial) using Baron and Kenny's (1986) mediation test. Because all three antecedents were significantly related to the mediator (ITSC) and the dependent variable (ITSQ) in Table 12 (Step 2), and their relationships with the dependent variable became non-significant when the mediator (ITSC) was entered into the respective equations (Step 3), it was concluded that IT service climate fully mediates the relationships between each climate antecedent and IT service quality outcome.

[2] The hypothesis test results would not be different if these two units had been excluded from the dataset.

[3] Boomsma (1982) suggested that LISREL needs at least 100 cases for adequate analysis. Chin and Newsted (1999) indicated that PLS can be performed with a sample size as low as 50.

Table 9
Descriptive statistics and correlation matrix from the matched IT–client units ($n = 39$).

	Variable	Avg. $r_{WG(J)}$	Mean	*s.d.*	Reliab. (α)	1	2	3	4	5
1	IT service climate	.91	4.81	.65	–[a]					
2	Tech competency	.85	5.19	.71	.64	.376				
3	Team support	.86	5.77	.57	.72	.596	.607			
4	Ancillary support	.89	5.12	.66	.90	.239	.426	.442		
5	Supervisory support	.91	4.85	.70	.87	.753	.504	.587	.362	
6	IT service quality	.76	−1.11	.82	.95	.420	.355	.485	.452	.467

[a] Reliability is not relevant to a formative construct (Petter et al., 2007) and is thus not calculated.

Table 10
IT service climate as a predictor of IT service quality (H1).

	Variables added	β	t	Sig.	ΔR^2	Total R^2
Step1	Org dummy 1	−.542	−2.689	.011		
	Org dummy 2	.024	.121	.904	.314	.314
Step 2	Step 1 +					
	Tech competency	.387	3.125	.004	.150	.464
Step 3	Step 2 +					
	IT service climate	.587	**5.891**	**.000**	.271	.735

Table 11
Antecedents of IT service climate (H2–4).

	Variables added		β	t	Sig.	ΔR^2	Total R^2
Supervisory support (H2)	Step1	Org dummy 1	.148	.621	.539		
		Org dummy 2	−.079	−.332	.742	.045	.045
	Step 2	Step 1 +					
		Sup. support	.821	**8.703**	**.000**	.653	.698
Team support (H3)	Step1	Org dummy 1	.148	.621	.539		
		Org dummy 2	−.079	−.332	.742	.045	.045
	Step 2	Step 1 +					
		Team support	.648	**5.230**	**.000**	.419	.464
Ancillary support (H4)	Step1	Org dummy 1	.148	.621	.539		
		Org dummy 2	−.079	−.332	.742	.045	.045
	Step 2	Step 1+					
		Ancillary support	.417	**2.717**	**.010**	.166	.211

6. Discussion and conclusion

In this section, we summarize the research findings, discuss contributions and limitations, and suggest directions for future research.

6.1. Summary of findings

The IT service climate construct has been shown to consist of three dimensions: Service Leadership, Service Vision, and Service Evaluation. The resulting 10-item measure of IT service climate has exhibited adequate validity and reliability and was significant in explaining client evaluations of IT service outcome in our participating organizations. While technical competency accounted for 15% of the variance in service outcome, IT service climate explained a further 27% of the variance. While these results confirm the importance of a technically competent IT workforce, they underscore the critical need to build a favorable service climate to improve service quality. As a senior IT manager suggested, "I would rather hire someone who may not be as technically strong but can work and communicate with our clients effectively... The project may take longer, but the outcome is going to be much better" (Jia and Reich, 2008, 2011).

Supervisory support, team support, and ancillary support have been established as antecedents of IT service climate. They situate IT service climate in the larger social context of the IT organization and provide the sociopsychological foundation on which ITSM frameworks, such as ITIL, can be successfully implemented. In this nomological net, IT service climate fully mediates the relationships between the three climate antecedents and IT service quality. This means that supervisory support, team support, and ancillary support only serve to improve the client service outcome through enhancing the service climate in the IT organization. Thus, managers must go beyond supportive team-oriented practices and focus explicitly on service climate to improve client service.

Table 12
IT service climate as a mediator.

	Variables added	β	t	Sig.	ΔR^2	Total R^2
I.						
Step1	Org dummy 1	−.542	−2.689	.011		
	Org dummy 2	.024	.121	.904	.314	.314
Step 2	Step 1 +					
	Supervisory support	.579	5.599	.000	.324	.638
Step 3	Step 1+					
	Supervisory support	.077	.457	.651		
	IT service climate	.529	3.250	.003		
	Tech competency	.131	1.266	.215	.098	.736
II.						
Step1	Org dummy 1	−.542	−2.689	.011		
	Org dummy 2	.024	.121	.904	.314	.314
Step 2	Step 1+					
	Team support	.513	4.657	.000	.262	.577
Step 3	Step 1+					
	Team support	.103	.759	.454		
	IT service climate	.535	4.405	.000		
	Tech competency	.104	.932	.358	.163	.739
III.						
Step1	Org dummy 1	−.542	−2.689	.011		
	Org dummy 2	.024	.121	.904	.314	.314
Step 2	Step 1 +					
	Ancillary support	.351	2.700	.011	.118	.432
Step 3	Step 1 +					
	Ancillary support	.055	.514	.611		
	IT service climate	.572	5.445	.000		
	Tech. competency	.128	1.221	.231	.304	.697

Our findings indicate that managers play a pivotal role in IT service provision. Their impact is felt at two levels – in providing general supervisory support and facilitation, a foundation on which a favorable service climate can be built, and in demonstrating leadership in guiding the daily work and service activities, which is an important component of IT service climate (i.e., Service Leadership).

6.2. Limitations

The above findings must be interpreted with the following limitations in mind. Although we were able to recruit strong representation from within the IT-business units studied in this research, the sample size at the unit level constrained our use of more sophisticated statistical methods. Though the factor loadings of the IT service climate instrument meet the recommended guidelines (Tabachnick and Fidell, 2007), loadings of several items are not as high as desired, and there is also the presence of cross loadings. Though the IT service climate instrument, as a new measure, has exhibited adequate validity and reliability, it needs to be refined in future research. In examining the impact of IT service climate on service quality, we only controlled for the organization and technical competency. Future research should consider using additional control variables. Further, it is acknowledged that a larger sample and more holistic SEM approach could reveal some level of persisting direct effects between the antecedents and ITSQ (thus partial mediation).

As discussed earlier, this study is an initial attempt at validating the IT service climate construct and assessing its relationship with IT service quality, and is by no means the final word. Despite these limitations, the research does provide a first indication of the efficacy of the climate construct in the domain of IT service. Keeping these caveats in mind, we next discuss its contributions to research and practice.

6.3. Contributions and future research

6.3.1. Contributions to research

This research program is the first to apply organizational climate theories to IT service quality, representing a theory-based extension to an area of work which is important both to researchers and practitioners. The current study extends the theory-building process by (1) developing and validating the new construct, and (2) empirically testing a research model that links IT service climate with a number of its antecedent and outcome variables. This theoretical extension may serve to reinvigorate research on IT service quality, which is one of the three pillars of IS success (DeLone and McLean, 2003; Pitt et al., 1995).

With the acknowledged caveats in mind, the IT service climate construct has been shown to consist of three dimensions and can be measured by a 10-item instrument, which provides a new empirical tool for IT researchers. The strength of the impact that IT service climate has also been demonstrated as it explained a significant portion of the variance in client ratings of service quality in our sample.

This study tests a set of three climate antecedents (supervisory support, team support, and internal ancillary support), an initial step toward developing a comprehensive nomological net for the IT service climate construct. Most importantly, climate theories can be considered a new theoretical lens to study IT phenomena such as IT governance and business–IT alignment.

This work extends the original service climate literature by demonstrating the efficacy of the service climate construct in a professional, knowledge-based service environment within the organization, beyond previous work on routine services to external customers, such as retail banking. This research also contributes to the service marketing literature, where there have been inconclusive results for the linkage between customer evaluations and internal functioning of the service provider (Parasuraman et al., 1991).

Building from literature in IS, management, and marketing, this research focuses on the first dimension of Tate and Evermann's (2010) IT service typology, i.e., service delivered by IT personnel to internal business clients. We hope that this work will complement studies using other notions of IT service (e.g. Service Oriented Architecture, and self-service technology) and contribute to the interdisciplinary approach to research in Service Management and Engineering.

6.3.2. Contributions to practice

This research makes a number of contributions to practice. The IT service climate approach complements and extends the work done by many IT departments to implement ITSM initiatives, such as ITIL and ISO/IEC 20000, which focus primarily on *internal*, *operational* goals such as process efficiency and cost savings. The IT service climate approach goes beyond comprehensive checklists and standard operating procedures by emphasizing the human side of IT service, particularly with regard to business clients, i.e., *external*, *client-driven* goals (Jia and Reich, 2008, 2011). From the socio-technical perspective, a favorable IT service climate can help build the sociopsychological foundation for implementation of these best-practice frameworks; a complex technical change. Experience of ITIL adopters supports this view, that successful implementation largely relies on how the IT organization can change its internal climate and establish a focus on people (Anthes, 2008; Thibodeau, 2007a/b).

By incorporating the service climate items in internal IT employee surveys, IT managers can estimate their clients' perceptions of service indirectly without having to survey clients. The 10-item survey, in conjunction with other instruments, can be used to diagnose issues and develop appropriate organizational interventions to improve service quality and IT alignment. Its parsimony and ease of use compare favorably with other measurement strategies (e.g., Parasuraman et al., 1991). However, it is important to realize that many factors can influence IT service outcomes, and IT service climate is but one of them.

The significant relationship between IT service climate and service quality suggests that managers who endeavor to enhance internal service climate can significantly improve client evaluations of their service quality, which can have a stronger organizational impact than systems quality and information quality (Gorla et al., 2010).

The multidimensional nature of the IT service climate construct underscores the scope and complexity of building a positive IT service climate. In addition to a service-oriented vision, managers must demonstrate leadership in guiding IT work and service, and employee evaluation must be aligned with the emphasis on service. Change programs should take a systemic approach to address all climate dimensions (Jia and Reich, 2008, 2011).

The three climate antecedents – day-to-day managerial support, support within work units, and broader cooperation across the IT organization – are all foundations on which a favorable IT service climate can be built. Indeed, service providers need to receive support from those that serve them before they can deliver quality service to customers (Schneider et al., 1998). Since supervisory support is an influential climate antecedent, IT executives aiming to enhance client service must ask, "Are we providing the necessary support to our employees so they can serve the clients effectively?"

As "climate engineers," managers shape the meaning that employees attribute to daily work and service activities (Kozlowski and Doherty, 1989). The IT service climate construct and research model explicitly place managers in the driver's seat in building and maintaining a favorable service climate (Jia and Reich, 2008, 2011). This explains why many interviewees found the notion of "climate engineers" empowering, which echoes the belief that the concept of climate, as contrasted with culture, is more actionable for managers (Schein, 1985, 1992) because it is more amenable to managerial intervention (Denison, 1996). For example, one Service Leadership item concerns whether the manager "regularly discusses with [employees] the best approaches to serve. . .clients," and a Service Vision item asks whether the unit "frequently shares information with clients." (See the Appendix for more examples.) These climate items represent daily practices and behaviors that managers can quickly adopt to make changes in the workplace to improve service climate. Judging from reactions of our participants, the notion of IT service climate will make a meaningful contribution to practice.

6.3.3. Future research

In addition to further refining the instrument and replicating our results in different settings, such as in new industries and different types of IT service (e.g., helpdesk, network), future research can study IT service climate at other levels of analysis, such as the IT function, and compare IT service climates across organizations.

Future research could also investigate how IT service climate may influence the other two pillars of IT success, i.e., information quality and systems quality (DeLone and McLean, 2003; Pitt et al., 1995), as well as the interrelationships among service, information and system quality.

This study only examined the service quality outcome of IT Service Climate. There is significant scope for future research to examine its implications on other measures of IT effectiveness such as system quality, business–IT alignment, and client satisfaction. In addition, it may be interesting to examine the congruence of IT service climate with general organizational service climate and relate IT service climate to overall organizational service success.

One of the three climate antecedents examined in this study is supervisory support. Future research should consider using a different measure to further delineate it from the Service Leadership dimension. All three climate antecedents tested in this study are related to various social processes in the workplace. Though our prior research posited a set of structural variables as climate antecedents, such as structural proximity (e.g., decentralization), they were not examined in this study due to the characteristics of the participating organizations (i.e., all had centralized IT). Future research should investigate these and other climate antecedents.

There is also much room for broader adoption and assimilation of climate theories in future IT work. It is hoped that this study will heighten interest in climate research in the IT community.

Appendix A. Items in the IT survey

All items are measured on 7-point Likert-like scales (1 = Strongly Disagree; 7 = Strongly Agree) unless otherwise noted.

IT service climate[a]	
Service Leadership	
LEAD2[b]	My unit manager spends time on planning and coordinating our work and service.
LEAD4	My unit manager regularly discusses work performance goals with us.
LEAD5	My unit manager frequently talks to us about how our service contributes to better performance of our clients.
LEAD6	My unit manager regularly discusses with us the best approaches to serve our clients.
Service Vision	
VIS1	In my unit's daily work, there is an emphasis on providing excellent service to our business clients.
VIS2[b]	My unit often suggests new ways to solve business problems.
VIS3	There has been true effort in our unit to establish ourselves as a respected partner of our clients.
VIS7	People in my unit are flexible when dealing with clients' perspectives.
COM3	My unit frequently shares information with clients.
COM6[b]	My unit actively solicits comments and feedback from clients.
Service Evaluation	
EVAL1	We receive recognition and reward for providing excellent service to our clients.
EVAL2[b]	Our compensation is linked to client evaluations of our service performance.
EVAL3	In my most recent performance review, I was evaluated on how well I served the clients.
EVAL4	Customer service is an important criterion of our formal performance evaluation.

[a] © Copyright, Jia and Reich (2011). Usage of the IT Service Climate instrument for academic research is permitted. Use for commercial, consultancy or other non-academic purposes is governed by the copyright and requires prior written authorization from the authors.

[b] Items dropped in the field test.

Ancillary support (Adapted from Schneider et al. (1998))	
Think of the area within IT on which your unit collaborates or depends on the most to do your work (e.g., DBA, network)	
AS1	How would you rate the job knowledge of the staff in this area? (1 = Very Negatively; 7 = Very Positively)
AS2	How would you rate the overall quality of service provided to you by this area? (1 = Very Negatively; 7 = Very Positively)
AS3	The staff in this area is very cooperative. (1 = Strongly Disagree; 7 = Strongly Agree)
Team support (Adapted from Campion et al. (1993))	
TS1	People in my unit are cooperative and friendly.
TS2	People in my unit work together to get the job done.
Supervisory support (Adapted from Oldham and Cummings (1996))	
SS1	My supervisor helps me solve work-related problems.
SS2	My supervisor encourages me to develop new skills.
SS3	My supervisor keeps informed about how employees think and feel about things.
SS4	My supervisor encourages employees to participate in important decisions.
SS5	My supervisor encourages employees to speak up when they disagree with a decision.
Technical competency (Developed in this study; pilot tested along with the climate scales)	
TC1	People in my unit have the necessary technical skills to do our work.
TC2	People in my unit are more technically competent than most units in which I have worked.

Appendix B. Confirmatory factor analysis (n = 192)

	ITSC-LEAD	ITSC-VISION	ITSC-EVAL	Ancillary support	Team support	Superv. support	Tech. comp.
LEAD4	0.67	0.44	0.44	0.18	0.34	0.52	0.31
LEAD5	0.84	0.55	0.55	0.23	0.43	0.66	0.39
LEAD6	0.84	0.55	0.55	0.23	0.43	0.66	0.39
VIS1	0.48	0.72	0.45	0.31	0.50	0.49	0.50
VIS3	0.53	0.80	0.50	0.34	0.55	0.54	0.55
VIS7	0.55	0.84	0.53	0.36	0.58	0.57	0.58
COM3	0.46	0.69	0.43	0.30	0.48	0.47	0.48
EVAL1	0.39	0.38	0.60	0.12	0.30	0.41	0.26
EVAL3	0.46	0.44	0.70	0.14	0.35	0.48	0.31
EVAL4	0.48	0.47	0.74	0.15	0.37	0.50	0.33
AS1	0.23	0.37	0.17	0.86	0.34	0.28	0.33
AS2	0.26	0.41	0.19	0.96	0.38	0.31	0.36
AS3	0.22	0.35	0.16	0.81	0.32	0.26	0.31
TS1	0.39	0.53	0.39	0.31	0.77	0.45	0.52
TS2	0.36	0.49	0.36	0.28	0.71	0.42	0.48
SS1	0.54	0.47	0.47	0.22	0.41	0.69	0.37
SS2	0.55	0.48	0.48	0.23	0.42	0.71	0.38
SS3	0.61	0.53	0.53	0.25	0.46	0.78	0.42
SS4	0.59	0.52	0.52	0.24	0.45	0.76	0.41
SS5	0.62	0.54	0.54	0.26	0.47	0.80	0.43
TC1	0.31	0.47	0.30	0.26	0.46	0.37	0.68
TC2	0.34	0.51	0.33	0.28	0.50	0.40	0.74

Appendix C. Items in the client survey

IT service quality (Pitt et al., 1995)

IT service quality is measured as a gap between Perceived Quality (P) and Expected Quality (E), i.e., *IT service quality (gap) = P – E.* All items are measured on 7-point Likert-like scales (1 = Strongly Disagree; 7 = Strongly Agree).

Service quality expectations

- Reliability

  E1. When the IT unit promises to do something by a certain time, it will do so.

  E2. When users have a problem, the IT unit will show a sincere interest in solving it.

  E3. The IT unit will be dependable.

  E4. The IT unit will provide its services at the times it promises to do so.

  E5. The IT unit will insist on error-free records.

- Responsiveness

  E6. The IT unit will tell users exactly when services will be performed.

  E7. The IT unit employees will give prompt service to users.

  E8. The IT unit employees will always be willing to help users.

  E9. The IT unit employees will never be too busy to respond to users' requests.

- Assurance

  E10. The behavior of the IT unit employees will instill confidence in users.

Service quality perceptions

- Reliability

  P1. When the IT unit promises to do something by a certain time, it does so.

  P2. When users have a problem, the IT unit shows a sincere interest in solving it.

  P3. The IT unit is dependable.

  P4. The IT unit provides its services at the times it promises to do so.

  P5. The IT unit insists on error-free records.

- Responsiveness

  P6. The IT unit tells users exactly when services will be performed.

  P7. The IT unit employees give prompt service to users.

  P8. The IT unit employees are always willing to help users.

  P9. The IT unit employees are never too busy to respond to users' requests.

- Assurance

  P10. The behavior of the IT unit employees instills confidence in users.

E11. Users will feel safe in their transactions with the IT unit employees.	P11. Users feel safe in their transactions with the IT unit employees.
E12. The IT unit employees will be consistently courteous with users.	P12. The IT unit employees are consistently courteous with users.
E13. The IT unit employees will have the knowledge to do their job well.	P13. The IT unit employees have the knowledge to do their job well.
• Empathy	• Empathy
E14. The IT unit will give users individual attention.	P14. The IT unit gives users individual attention.
E15. The IT unit will have operating hours convenient to all its users.	P15. The IT unit has operating hours convenient to all its users.
E16. The IT unit will have employees who give users personal attention.	P16. The IT unit has employees who give users personal attention.
E17. The IT unit will have the users' best interests at heart.	P17. The IT unit has the users' best interests at heart.
E18. The IT unit employees will understand the specific needs of its users.	P18. The IT unit employees understand the specific needs of its users.

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