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DIMENSIONS OF DISTRIBUTIVE FAIRNESS RELATED TO IS RESOURCES AND THEIR RELATIONSHIP WITH USER SATISFACTION WITH THE IS DEPARTMENT

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ABSTRACT

Distributive fairness plays an important role in the MIS context in determining user attitudes. This paper investigates the different dimensions of distributive fairness, and their impact on the IS quality issues and users' satisfaction with the IS department. Drawing from prior literature, this paper identifies and empirically validates three dimensions of distributive fairness in the IS context: fairness in resource allocation (RA), fairness in process outcomes (PO), and fairness in information access design (IAD). Results confirm that these dimensions are distinct, and they influence users' perception of IS quality dimensions and user satisfaction with the IS department (USISD) to different degrees. Especially, PO is found to be the most important factor that influences IS success dimensions. In addition, the results reveal that system quality and service quality directly affect USISD, but information quality influences USISD indirectly through system quality. Overall, the proposed model is found to explain 68% of USISD, which is quite good for behavioral studies. The results also highlight the important role of IS professionals in acting fairly and responsively to user needs as well as endeavoring to build good quality systems to achieve greater USISD.

Keywords: distributive fairness, equity, user information systems satisfaction, resource allocation, process outcomes, information access design, system quality, information quality, service quality, IS success

INTRODUCTION

Users feedback about their Information Systems (IS) department plays a vital role in the evaluation of the IS function by the top management. Often there are no reliable, objective measures to assess the performance of the IS function [86]. Therefore, user satisfaction with the IS department is known to play a vital role in the assessment of the IS department [36, 57]. Low satisfaction can impact the credibility of the IS department and its ability to take a leadership role in the IS development and implementation. Understandably, users' attitudes toward IS departments has been reported to be a major concern of CIOs [57, 65].

One of the important factors in users' assessment of the IS department is the fairness of their IS outcomes. IS environment and projects are characterized by allocation of resources to different user groups which may give rise to conflicts among organizational members [59, 72]. IS department is often viewed as an allocator that plays an important role in the assignment of priorities and

resources, and resolving conflicting requirements during the IS implementation. If the allocations are not viewed as fair by some user groups, it may lead them to resist such changes [54] and develop negative attitudes toward the IS department. Users also participate in the IS development and implementation. Their perceptions of fairness or equity of the outcomes during their participation play an important role in fostering a positive attitude toward IS and IS personnel ([67]. In other words, even though users may devote a significant amount of their time and effort in participation, they may not have a favorable attitude toward IS and IS personnel/department if their interests are not reflected in the outcomes made. In addition, some user groups may also compete for control over information and engage in the use of power to serve their own interests [53], which may lead to a distribution of information resources and design choices that may be considered as unfair by other users [48]. Such user perceptions of unfair treatment during the IS development may also adversely influence their assessment of the IS performance.

To address these issues, equity theory[1] has been employed for studying the social and political issues in the IS context, and different scales have been employed to measure different types of fairness in this context (e.g., [6, 16, 38, 39, 41, 48, 49, 89]. However, in prior studies, different dimensions of distributive fairness which users may distinctively perceive in the IS development/implementation have not been clearly specified and investigated [6]. In addition, user satisfaction in many extant studies have been limited to users' emotional gratification with IS rather than an IS department in an organization. Since an IS department is an internal provider in an organization [27], users' assessment of the IS department may be related to the perception of IS products and services in addition to the fairness issues. User satisfaction in this paper is considered as users' evaluation of the IS department in an organization, which would be influenced by their experiences with its products and services [24, 33].

Based on the above discussion, this paper aims to investigate the following research questions:

What are the underlying dimensions of distributive fairness in the IS context?

How are users' perceptions of distributive fairness associated with their evaluation of IS products and services and satisfaction with the IS department?

We believe that this study would help clarify and better understand the different role of distributive fairness dimensions in users' evaluation of IS products and services, and the IS department in an organization. The findings should also be of interest to IS professionals in managing IS activities and in achieving higher user satisfaction with their department.

THEORETICAL BACKGROUND

Equity Theory

Equity issues have been examined by management and organizational scholars for decades. Fairness construct is generally viewed as consisting of four factors: distributive, procedural, interpersonal, and informational fairness [21]. Research in justice theories started with Adams' [4] seminal work on equity theory, which emphasizes the perceived fairness of outcomes, also called distributive fairness. Adams stressed that people are likely to be concerned more about the fairness of their outcomes based on their inputs, rather than the absolute level of outcomes. Equity theory is a mature and established theory that has been rated to have the second highest scientific validity out of 72 organizational behavior theories [62].

Due to its focus on outcomes, distributive justice is predicted to be related mainly to cognitive, affective and behavioral reactions to particular outcomes [20]. To better understand human behavior, research focus has also included procedural justice [99], which advocates that the perceived fairness of the process by which the outcomes were achieved also plays an important role in influencing attitudes and behaviors. Leventhal [55] emphasized consistency across people and time, provision of accurate information, and conformance with standards of ethics or morality to ensure procedural justice. In the recent literature, interpersonal justice and informational justice have been identified as two additional types of fairness that focus on how the procedures are implemented. Interpersonal justice describes feelings of fairness regarding how one is treated in an organization by his/her supervisor during the implementation of procedures [12, 21]. Informational justice considers whether the explanations and information related to the procedures adopted are properly conveyed to the participants [12, 21]. Further, Colquitt [21] identified through confirmatory factor analysis that distributive, procedural, interpersonal, and information justice are distinct dimensions. Additionally, he found that these four fairness concepts are predictive of different outcomes (i.e., distributive –

[1] Equity, fairness, and justice have been used interchangeably in prior studies. Therefore, we use the term fairness to refer to the same concept as equity in line with the nomenclature used in the prior literature.

outcome satisfaction and instrumentality, procedural – leader evaluation and helping behavior, interactional – rule compliance and group commitment, and informational – collective esteem).

In the IS area, equity/fairness has been considered in investigating user attitudes, user participation during the IS development, and acceptance/resistance to new systems and technologies as noted earlier. These studies are primarily based on two fairness issues: distributive and procedural fairness. First, with regard to the distributive fairness, Nolan [68] identified understandability, controllability, cost/benefit incidence, and accountability as four aspects of maturity, which was used as a surrogate for fairness, and found that managers' attitudes toward IS depend in part on the level of maturity. Olson and Ives [71] expanded Nolan's [68] study by adding a dependent variable 'user involvement', and found that information satisfaction would decrease as more sophisticated allocation methods are used, contrasting the results of Nolan's [68] study. Bergeron [10, 11], based on these two studies, recognized accountability, authority over data processing activities, user involvement in MIS budget, cost variability, and quality of information as five important characteristics of IS that are positively correlated with information use. These four studies focused only on the context of chargeback systems, which limits their generalizability to some extent. In a study focused on distributive justice, Joshi [48] asserted that in an IS environment, different user groups or departments tend to interact and compete with each other for IS resources. Identification with the group (e.g., department, campus, team, etc.) and awareness of its outcomes can also provide a frame of reference for an individual in assessing her/his fairness perceptions [104]. Therefore, users' perceptions of IS outcomes in comparison to other users can provide a basis for the assessment of fairness. Based on this assertion, Joshi [48] developed and empirically tested the scales to measure distributive fairness. Distributive fairness was shown to be correlated with user information satisfaction and its constituent factors [49], identified by Ives et al. [45]. Recently, Au et al. [6] used equitable relatedness fulfillment, equitable work performance fulfillment, and equitable self-development fulfillment as the three dimensions of distributive fairness, and found that the first two factors positively affect end user IS satisfaction.

Second, with regard to the procedural fairness, Hunton and colleagues employed perceptions of procedural justice for studying the quality of user's participation/involvement during the IS development. Hunton [39] found that users can increase their quality of participation via procedures that give users voice and/or choice in developing systems alternatives and in choosing one of them for implementation. The increased level of participation was found to improve users' attitudes and behavior towards IS. Similarly, Hunton and Price [41] found that perception of procedural justice can increase the level of user's satisfaction with IS and their job performance. Hunton and Beeler [40] also used 'the level of instrumental voice' as an experimental condition. They found that user attitudes, user involvement and performance were greater in the instrumental voice condition compared to the non-instrumental and no-voice conditions.

In sum, equity issues have been found to be relevant and useful in understanding and explaining issues related to users' attitudes, evaluation of IS, and performance. We believe that an explicit consideration of the dimensions of distributive fairness in the IS context will improve our understanding of the phenomenon, and help develop better IS management strategies.

Information Systems Success Model

An assessment of IS success (and effectiveness) has been known to be critical for IS management [27]. Many prior studies have defined the meaning of IS success and identified its determinants. Among them, one of the most widely adopted models in IS literature is DeLone and McLean's [26] IS success model, which explains that 1) IS success should be viewed to be multidimensional, consisting of system quality, information quality, use, user satisfaction, individual impact, and organizational impact; and 2) the selection of the appropriate dimensions of IS success depends on the objectives and contexts of research.

Seddon [85] reinvestigated DeLone and McLean's [26] IS success model, and argued that the use of IS should be a result of IS success. Based on this assertion, the author proposed three groups of interrelated variables in the IS success model: information and system quality, IS use, perceived usefulness and user satisfaction as expected net benefits of the IS use. Rai et al. [77] empirically examined both DeLone and McLean's [26] and Seddon's [85] models, and then proposed an amended Seddon's model, which included a correlational relationship between perceived usefulness and IS use. Iivari [42] examined DeLone and McLean's [26] model, and compared the direction of causal influence between IS use and satisfaction, based on Seddon's [85] argument. The author found that both system quality and information quality influence user satisfaction, and the paths from information systems use to user satisfaction, and *vice versa*, are both significant. Sabherwal et al. [81] conducted a meta-analysis to investigate a group of relationships among system quality, perceived usefulness,

user satisfaction, and system use, which are a part of an IS success model. The authors found that system quality significantly influences user satisfaction and system use. Similar to Rai et al. [77], they also found a correlational relationship between perceived usefulness and information systems use.

DeLone and McLean [27] highlighted IS organization's dual role of not only an IS provider but also a service provider, and added service quality to their original model. Similarly, the service dimension in the IS context has been identified to be important in prior studies (e.g., [47, 52, 74]). These quality issues in DeLone and McLean's new model include information quality, system quality, and service quality. According to the author, the system quality is defined as a desirable characteristic of IS (consisting of usability, availability, reliability, adaptability, and response time), information quality refers to the perception of characteristics of the information provided by the system, which include timeliness, currency, reliability and relevancy of information, and service quality means the quality of services provided by an IS organization/department.

The major role of an IS department is to develop and maintain IS in an organization. Hence, user satisfaction with an IS department may be related to their satisfaction with IS products as well as IS services. Similar to DeLone and McLean's [27] assertions about satisfaction with IS as noted above, we argue that *users' evaluations of their IS department would be related to both IS products and services*. This is in line with the findings in the marketing context, where customers' overall satisfaction with a provider has been known to be comprised of product and service component attributes [64] and/or processes [80].

User Satisfaction

User satisfaction is a keenly researched topic in the information systems area and is an important indicator of IS success [26]. It is commonly defined as an attitude users have towards a specific information system [107] and refers to the extent to which users believe the information system meets their information requirements [81]. It indicates the success or failure of an information system [32] and is also viewed as an indicator of user perception of IS effectiveness [7]. An overview of prior user satisfaction research is presented in Table 1.

Much of the earlier research effort in the area focused on verifying the psychometric properties and the generalizability of the End User Satisfaction instruments to different contexts (e.g., [30, 60, 94]. Recent efforts have focused on identifying antecedents that influence the perceptions of user satisfaction [6, 29]. Justice theories have also been applied in the IS context to understand user satisfaction with the IS department [16, 48,49], attitude towards IS and user satisfaction [37, 39, 40], satisfaction and intentions with web-based learning [17]. A key application of justice theories in IS has been to propose a theoretical model, Equity Implementation Model (EIM), for understanding acceptance/resistance of new technology[50]. Joshi [50] proposed the EIM to explain why users may adopt or resist a new technology based on perceptions that use of the technology is favorable or unfavorable to them. The EIM suggests that users make equity evaluations of new technology through three social comparisons: 1) their own individual net benefits from using or not using the technology, 2) their net benefits as compared to the net benefits of some authority or organization, and 3) their net benefits as compared to other users.

Information Systems vs. the IS Function

A closer look at the empirical research conducted in the area reveals that most studies look at the user's satisfaction with the information system as well as the IS department. Some studies have used the overall IS satisfaction as a label for satisfaction with the IS department (e.g., [49]). While the information system is a key artifact, the IS function also plays a critical role within the organization [52, 90] and interaction with IT department staff influences user's perception of service satisfaction [16]. The IS function plays a key role in distributing information resources [48] and user's satisfaction with information systems might be influenced with their overall perceptions of the IS department. In organizations with internal IS providers, user evaluation of the IS function is used to measure the effectiveness of the function [16] and to measure customer service quality. Our conceptualization of user satisfaction and the instruments used to measure it are more aligned with Ives, Olsen & Baroudi [45] and Olsen & Ives [71] where the focus is on IS related deliverables from the IS department which include IS products, IS service, and training and support to users. IS department also has a role in the allocation of IS resources to various departments, as well as in the setting of procedures and priorities for the development of systems. Thus IS department would be a more appropriate target of users' attitudinal responses to the allocation of IS resources and procedures employed for such allocations and systems development compared to the system itself. Therefore, with the focus on equity issues in this paper, we believe that satisfaction with an IS function and its activities would provide a more suitable dependent variable to capture users' attitudes.

Table 1: Prior User Satisfaction Research

Authors	Description of Study	Study	User Satisfaction Measure	IS Artifact Studied
Ives, Olsen & Baroudi [45]	Development and validation of UIS instrument; 280 production managers in manufacturing organizations	Cross sectional survey	User information satisfaction with the IS environment	IS Department
Torzadeh & Doll [91]	Test-Retest Reliability of the end user satisfaction instrument; 41 student respondents	Cross sectional survey	End user satisfaction with information systems	Information System
Doll et al [30]	Factor analysis of end user satisfaction instrument; 409 respondents from 18 organizations	Cross sectional survey	End user satisfaction with information systems	Information System
Joshi [49]	Impact of equity issues on user information satisfaction; 7 organizations including an university; 226 respondents (including 61 students)	Cross sectional survey	Overall user satisfaction with information systems	IS Department
Kettinger & Lee [52]	User satisfaction with the Information Services function; 342 student respondents	Cross sectional survey	Combined USISF and IS version of SERVQUAL instruments	IS Department
McHaney & Cronan ([60]	Satisfaction of computer simulation users; 125 usable responses from the members of the Society of Computer Simulation	Cross sectional survey	End user satisfaction with discrete computer simulation	Information System
Somers et al [94]	User satisfaction of ERP systems; 407 users of ERP systems from 214 organizations	Cross sectional survey	End user satisfaction with ERP systems	Information System
Abdinnour-Helm et al [1]	Usability evaluation of website; 176 student respondents	Lab	End user satisfaction with web site	Information System
Carr [16]	Service fairness & satisfaction with internal IS service provider; 879 respondents of a single organization	Cross sectional survey	Satisfaction with IT staff	IS Department
Au et al [6]	Investigating antecedents of IS satisfaction; 922 respondents from the hotel and airline industry sectors	Cross sectional survey	End user satisfaction with IS used at work	Information System
Susarla et al [97]	Post usage satisfaction with application service providers; 256 respondent firms	Cross sectional survey	Satisfaction with ASP firm	IS Provider Firm
Karimi et al [51]	Impact of environmental uncertainty & task characteristics on user satisfaction; Matched responses from 77 CEOs and 166 senior managers	Cross sectional survey	User satisfaction with data	Data/Information[2]
McKinney et al [61]	Measurement of web-customer satisfaction; 314 student respondents	Lab	End user satisfaction with information, system & overall quality of website	Information System
Devaraj et al [29]	Antecedents of B2C channel satisfaction; 134 respondents of a social organization	Cross sectional survey	User satisfaction with online experience, information content & ability to make purchase	Information System
Sethi & King [90]	Nonlinear model of user satisfaction with IS; 50 academic respondents from an university	Cross sectional survey	User information satisfaction with overall IS department and specific IS factors	IS Department & Information System
Current study	Impact of distributive fairness dimensions on IS quality & user service satisfaction; 185 respondents from 9 organizations	Cross sectional survey	User satisfaction with IS department	IS Department

[2] The authors refer to "data" and "information" interchangeably in the paper.

HYPOTHESES

Based on prior studies related to modeling user information systems satisfaction (e.g., [27, 49]), this study proposes a research model that considers the dimensions of distributive fairness and their distinct influence on different IS quality dimensions (*See* Figure 1). The proposed model is distinct from prior efforts in that 1) unlike Joshi [48], this study identifies distributive fairness as composed of three factors: perception of fairness in resource allocation (RA), in process outcomes (PO), and in information access design (IAD), 2) it focuses on their relationships with the IS quality dimensions, and 3) it examines the influence of the dimensions of distributive fairness on user satisfaction with the IS department. This study would also provide an opportunity to empirically test the model proposed by DeLone and McLean [27], which has not been tested in prior studies. The hypotheses are explicated below.

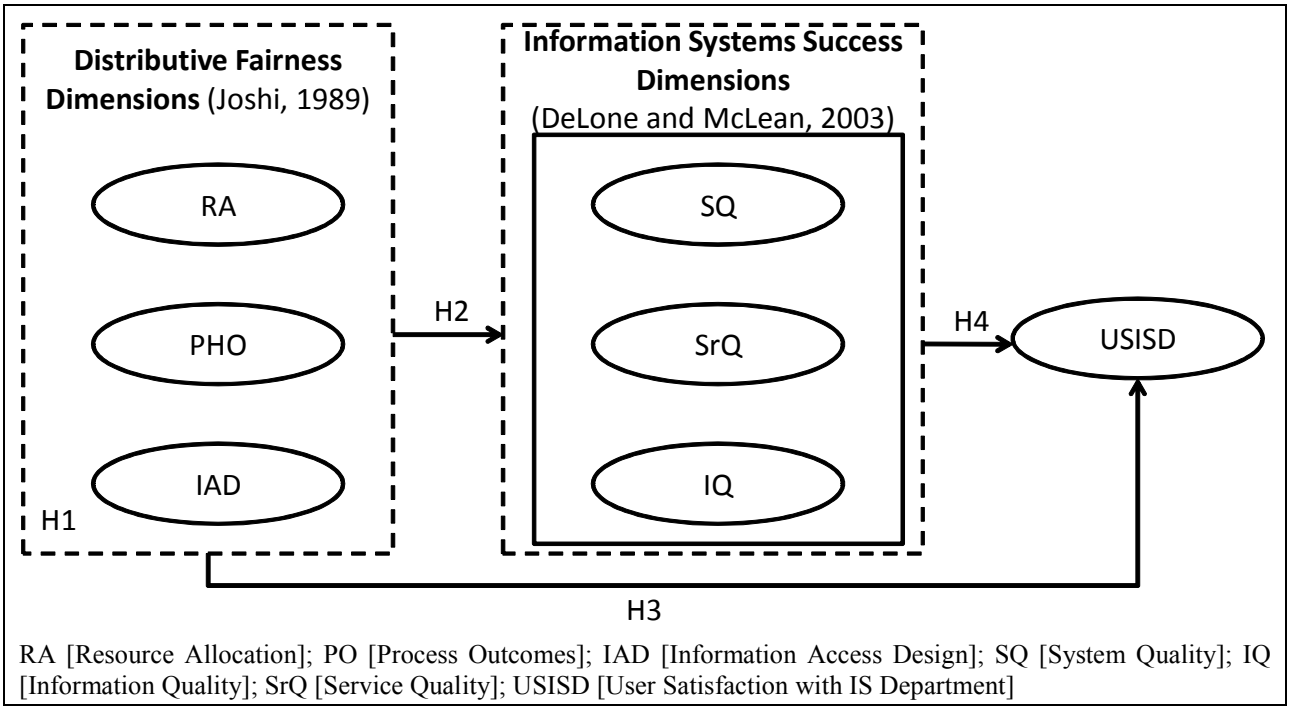


Figure 1: Research Model

Factor Structure of Distributive Equity/Fairness

Cohen-Charash and Spector [20] defined distributive justice as cognitive, affective, and behavioral reactions towards perceived outcome distribution. In other words, distributive fairness focuses on individuals' perceived fairness of outcomes and their overall reactions to outcome distribution [4, 103]. In management research, different scales have been used to measure dimensions of distributive fairness such as salary, promotion, and workload [21].

In the IS context, equity has been measured directly by asking users to assess their outcomes by comparing their outcomes with those of other users (or user groups) [48]. The relevant dimensions of distributive fairness for the IS context were noted in Joshi [48], though not empirically evaluated. These were categorized into three types: fairness in the allotment of IS resources, in the design choices made (related to information access), and in the assignment of priorities and conflict resolution, though the overall IS equity was treated as a single factor in that study. Other than Joshi's studies, a few prior studies considered the related dimensions of perceived distributive fairness in the IS context. For

example, distributive fairness issues were categorized into understandability, controllability, cost/benefit incidence, and accountability of the systems [68, 71], accountability, authority over data, user involvement in MIS budget preparation, cost variability, and quality of information [10, 11]. Similarly, a few studies related to procedural fairness in the IS context have also reported different dimensions of procedural fairness, for instance the level of users' voice and choice in the prioritization of software modification [39], in the design, selection, and placement of options for data entry screens [41], in the report formats, screen layouts, input and output forms, and the procedure manual [40] and involvement in IS prioritization and IS design [73]. These studies show that examining the different dimensions of procedural fairness has also been useful in understanding equity issues.

Even though these studies reported some dimensions related to fairness issues, as discussed above, some of the studies [10, 11, 68, 71] are based on the fairness of the chargeback for the IS use. In addition, other studies [39, 40, 41, 73] focus on procedural justice. In this paper, we adopted the three distinct dimensions of distributive fairness based on Joshi's [48] conceptualization and proposed them as distributive fairness in the IS resource allocation (RA), in process outcomes (PO), and in the information access design (IAD). Each of the dimensions is explicated as follows.

Fairness in IS resource allocation (RA) refers to a user's perception of the relevant IS resources such as computer time, budget, assignment of IS staff, and hardware provided to his unit (or her) when compared to what was provided to other units or users [48, 49]. The IS development involves distribution of resources [91, 92]. Hence, political and managerial issues related to the fair resource allocation would be important in the IS development [10, 11].

Fairness in process outcomes (PO) refers to a user's perception of priority assigned to his/her projects and how the conflicts with other user groups are handled and resolved during the implementation [48, 49]. The IS development may involve politics in an organization and power struggle among users as well as between users and developers [43, 102]. Frequently these two groups may have different point of views, goals and interests [3, 25, 79]. In such an environment, users' experiences with the use of power and the politics may be salient and users may be sensitive to the outcomes in conflict resolution and priority assignment. Users may perceive unfairness in process outcomes, when conflict resolution and priority settings are improperly handled.

In the IS implementation, users may have different levels of authorizations to access information. Fairness in the information access design (IAD) in the IS context refers to a user's perception of the level of access to information and privileges and control over information in relation to other users [48, 49]. Because access to and control over information represent power in an organization [63, 75], individuals in an organization may want to access more information. Accordingly, users may perceive fairness issues related to information access when they compare their authorizations to that of others.

As discussed above, the three dimensions of distributive fairness in the IS context (i.e., RA, PO, IAD) are likely to be distinct due to their foci on different IS issues. This rationale leads to the following first hypothesis:

H1: Distributive fairness in IS context will be composed of three distinct sub-factors which are fairness in resource allocation (RA), in process outcomes (PO), and in information access design (IAD).

Nomological Nets of Distributive Fairness Dimensions

When individuals perceive unfairness, they are likely to attribute the cause of the unfairness to a person or an agent who is held responsible for the situation [19]. Nozick [69] and Rawls [78] note that a perception of justice also involves beliefs about the causes of, and responsibility for, the allotment of resources. A perception of unfairness can influence a person's attitude toward the relationship of the person with the other person or agent who is responsible for the unfairness [5]. As discussed above, along with the attribution of the unfairness, it has been found that individuals tend to find an object(s) as the focus for their resistance, and their reactions can vary based on the objects they perceive [46], when treated unfairly.

In the IS context, users may perceive unfair treatment in the dimensions (i.e., RA, PO, and IAD) noted earlier. *When they experience unfair treatment, they may also judge the objects they perceive in the IS context (information systems products and services) with a low evaluation in reaction to the unfair treatment* [46, 49]. *Users are also likely to hold the IS department responsible for the unfair treatment, which would influence their satisfaction with the IS department.*

Influence of Distributive Fairness on Users' Evaluation of IS Products and Services: With regard to IS resource allocation, users with low RA may find that the system quality (SQ) does not meet their requirements and are likely to assess SQ as low. For example, if a user unit is assigned a relatively lower level of hardware, the resulting systems may be perceived to be

of a lower quality. In addition, if a user unit is given fewer IS related budgetary resources, they may have to put up with substandard systems. Users who perceive low RA are likely to evaluate service quality and information quality to be low. However, RA may have a greater effect on system quality than information and service quality, since it directly influences the resources made available compared to the level of service or information provided to users.

Users may also perceive unfairness in the priorities assigned, and the way the conflicts are resolved in the IS context, which would lead to low fairness in process outcomes (PO). Unlike RA, IS personnel may be directly involved in setting priorities and resolving conflicts, which are likely to influence the interpersonal dynamics between users and MIS staff, and affect the perceptions of service quality. PO may also moderately influence other quality issues, when users feel that they are assigned unfairly low priorities and that the conflict resolution efforts are unfavorable to them. However, given the direct personal interaction with IS staff and attribution of the outcomes to them, it is likely that PO would affect service quality relatively more than system and information quality.

With regard to fairness in information access design (IAD), poor information access may lower users' perceptions of information quality due to their limited access to information. With restrictions on information access, users may find that the information does not meet their requirements and consequently evaluate information quality to be low. Thus, IAD may have an effect mainly on information quality.

Taken together, the following hypotheses can be proposed:

H2: The sub-factors of distributive fairness will have distinct relationships with information system quality dimensions. In other words,

H2-1: Fairness in resource allocation will have the largest effect on system quality.

H2-2: Fairness in process outcomes will have the largest effect on service quality.

H2-3: Fairness in information access design will have the largest effect on information quality.

Users' Attribution of (Un)Fairness to the IS Department: Individuals' attitude toward the relationship with other persons has been known to be influenced by unfairness and the assigned responsibility [5, 19]. In the IS context, users' attribution of distributive fairness to their IS department is supported by prior studies, and equity issues related to IS have been found to be major determinants of user satisfaction [49]. Systemic fairness, which includes distributive fairness as one of its components, influences overall IT staff satisfaction [16]. Similarly, in the marketing context, according to inter-personal needs theory, individuals want their needs/goals to be fulfilled/achieved in their interaction with others and their voices respected during the interactions [84]. Further, customers' perception of fairness has been known to be a key factor that influences satisfaction with their provider (e.g., a firm) [88].

The IS development involves distribution of resources [91, 92], which has political and managerial implications [10, 11]. Even if an IS department in an organization does not have a complete authority over the distribution of IS resources based on organizational policies, users may still attribute the responsibility for (un)fair treatment to the IS department as executors or administrators of the policy. The IS development may also involve politics within an organization among different stakeholders [43, 102], who may have different goals and interests [3, 25, 79]. In such situations, users may interact with IS personnel during the implementation process to voice their concerns and achieve their goals. If users feel that their voices are not respected and their needs are not fulfilled, they may perceive unfair treatment in the process outcomes, which may lead them to develop negative attitudes toward the IS department. Because access to and control over information represent power in an organization [63, 75], individuals in an organization may want to access more information. In most cases, information access privileges are assigned based on users' roles and rank in organizations. However, users may sometimes expect additional access rights to better meet their job requirements, which may not be permitted by the IS department. Such denials may lead to perceptions of unfair treatment, and those who are denied access to information that they consider useful may feel discouraged and develop negative attitudes. Such denial of access to information contained in organizational systems that is considered unfair may affect users' attitudes towards an IS department.

Taken together, the perceptions of distributive fairness dimensions (resource allocation; process outcomes; information access design) are also likely to influence user satisfaction with IS department. Based on this discussion, we propose the following hypotheses:

H3: Distributive fairness dimensions will positively affect user satisfaction with IS department.

H3-1: Fairness in resource allocation will positively affect user satisfaction with IS department.

H3-2: Fairness in process outcomes will positively affect user satisfaction with IS department.

H3-3: Fairness in information access design will positively affect user satisfaction with IS department.

The Relationship between IS Service Quality and Satisfaction with an IS Department

User satisfaction with IS and its antecedents have been investigated in numerous prior studies to assess IS success (e.g., [9, 26, 27, 35, 44, 47, 52, 73, 77, 82, 86, 106]. With regard to relationships of IS quality dimensions with user satisfaction with an IS department, few studies in the IS context directly assessed these relationships. For example, quality of information products was found to be positively related to users' satisfaction with the data processing group [45], though the authors named it user information satisfaction. Carr [16] identified that service quality influenced overall IT staff satisfaction. As discussed briefly earlier, an IS department in an organization plays various roles from developing to implementing to maintaining IS. Therefore, users' attitudes toward their IS department could rely on all these roles, including quality of IS products and services.

Similarly, some marketing literature supports this notion. Individuals are likely to have particular needs that must be fulfilled in their interactions, and these needs are having a sense of authority and being treated by providers with respect [84]. In addition, customers' satisfaction with a provider (or firm) was empirically found to be positively influenced by customers' attitudes toward both products and services provided [35, 64], which may be formed by their evaluations of the products and services. An IS department is likely to contact users during IS development and implementation. If users perceive a high quality in the IS products and services provided by IS personnel, such positive perceptions may reflect their fulfillment of needs. Thus quality perceptions may positively affect users' satisfaction with an IS department.

Based on the above discussion, the following hypotheses are proposed:

H4: Information system quality dimensions will positively affect user satisfaction with an IS department.

H4-1: System quality will positively affect user satisfaction with an IS department.

H4-2: Information quality will positively affect user satisfaction with an IS department.

H4-3: Service quality will positively affect user satisfaction with an IS department.

Some of the issues addressed by the hypotheses are illustrated in an episode included in Appendix D, entitled: Turner College Episode.

METHOD

Data Collection

Data for this study was obtained through a survey of users in the mid-Western US organizations who were contacted through their managers. Employees from nine different large organizations in the US participated in this study. In order to obtain a higher response rate, anonymous responses were collected by a designated organizational representative and forwarded to the authors. About 350 survey instruments were distributed, out of which 185 usable responses were received for this study. Total response rate was 52.9%, indicating a higher rate of return compared to other studies. IS users in the organizations were from different functional areas such as accounting, administration, finance, marketing, operations, personnel, and planning. In addition, the participants were positioned at different levels in the organizations. Average experience of the respondents with organizational IS was 8 years with a standard deviation of 5.99, indicating that users have a wide range of experience. Demographic information about the respondents is included in Table 2.

Analysis Methodology

Data were analyzed in two stages to validate the measurement model of the constructs and to assess the nomological nets among the constructs with Lisrel 8.5, as recommended by Anderson and Gerbing [2], Cronbach and Meehl [23], and Burton-Jones and Straub [14]. In other words, the meaning of the constructs is assessed in part by their internal structure and in part by the related constructs [23] as hypothesized. Especially, since a three-factor structure for 'distributive fairness' was proposed in this study, we believe that a separate analysis of the measurement model related to distributive fairness would be appropriate for assessing construct validity, before conducting structural equation modeling. Therefore, in the first stage, we conducted factor analyses to identify the factor structure of distributive fairness using the equity scales reported in Joshi [48], and then analyzed the discriminant and convergent validity of all the constructs used in this study along with the identified three fairness dimensions. In the second stage, we conducted structural equation modeling to test the nomological net to verify the distinct nature of the three dimensions of distributive fairness (RA, PO, and IAD) and to evaluate the main research model and a possible rival model.

Table 2: Demographic Information about Respondents

Rank	Others	32	17.4
	Supervisory	71	38.6
	Middle Management	62	33.7
	Senior Management	18	9.8
	Missing	1	.5
Dependence on IS (Time to Spend in Using IS for Job)	0-5%	11	6.0
	5-15%	41	22.3
	15-25%	35	19.0
	25-40%	25	13.6
	40-60%	19	10.3
	60-80%	33	17.9
	80-100%	17	9.2
	Missing	3	1.6
Department	Accounting	32	17.4
	Administration	10	5.4
	Finance	17	9.2
	Marketing	9	4.9
	Operations	18	9.8
	Human Resource	7	3.8
	Planning	6	3.3
	etc.	82	44.6
	Missing	3	1.6
Total		184	1.0

Measurement

The unit of analysis in this study is at the individual level. All the constructs in this study were measured using extant scales that focus on a user's perceptions. For example, information quality, system quality, service quality, and user satisfaction with an IS department were measured drawing from Ives et al.'s [45] scales. Though Ives et al.'s [45] scale was initially developed to measure overall user satisfaction with IS function, Kettinger and Lee [52] show that the satisfaction has three underlying sub-factors: user knowledge and involvement, quality of information product, and attitude toward IS staff and services. In this paper, we adopted the items related to quality of information product, and attitude toward IS staff and services from Ives et al.'s [45] scales to measure information quality, system quality, and service quality. Further, based on the prior studies, we identified the semantic differences in the items related to the quality of information product in Ives et al. [45]. For example, flexibility of and confidence in systems pertain to system quality, whereas reliability, relevancy, accuracy, precision, and completeness of output information system are related to information quality [27, 42, 107]. Thus, we divided Ives et al.'s [45] quality of information product into two factors: information quality and system quality. In addition, we also examined and compared one-factor structure (quality of information product) with two-factor structure (information quality and system quality). The result supported that the two factor structure would be a better fit. (This result can be provided upon request).

The three dimensions of distributive fairness (RA, PO, and IAD) were measured with scales developed by Joshi [48] that consider users' perception of distributive outcomes compared to others. As discussed earlier, though Joshi [48] originally developed the scales to measure distributive fairness as a single construct, we believe that the three constructs would be distinct. Table A1 in Appendix A lists the items employed to measure these constructs.

We believe that content validity is supported by the fact that all the variables used in this research are adopted from standard instruments employed in prior IS studies [95]. The issues related to the construct validity of the variables employed are discussed in the following section.

RESULTS

Validities and Reliabilities

To assess the factor structure, we conducted factor analyses based on a prior knowledge of the three-factor structure of distributive fairness noted, though not tested, in Joshi [48]. Table 3 shows the result of the factor analysis related to distributive fairness. As the table shows, all the items clearly load on the three factors noted in Joshi [48]. Fit indices from the factor analysis are satisfactory, though p-value does not suggest a good-fit (df = 17, χ^2= 31.80, P = 0.005). However, multiple indicators have been used to test the goodness of fit, and p-value should not be viewed as an absolute indicator because of its sensitivity to the sample size Rai et al. [77]. Several indicators support a good-fit based on prior studies. The ratio of χ^2/df (=1.87) is reasonable based on Wheaton et al.'s [105] and Carmines and McIver [15] criteria. Standardized Root Mean Square Residual (SRMR) of 0.04 and Root Mean Square Error of Approximation (RAMSEA) of 0.07 are below the recommended values of 0.10 [87] and 0.08 [13], respectively. Comparative fit index and incremental fit index are 0.98 and 0.98 respectively, which are above the level of 0.90 [87]. We compared the goodness of fit of the three-factor-structure model with that of the one-factor model identified in Joshi [48]. In the one-factor model, most of the fitness indices indicate a poor fit, which makes the model unacceptable (df = 20, χ^2= 188.45, P=0.00, RAMSEA=0.21, SRMR = 0.093, CFI = 0.77, IFI = 0.77). Thus, we believe that the three-factor structure is more appropriate, and the use of the three-factor structure is reasonable for the subsequent analysis.

To further evaluate the robustness of the three-factor structure, we conducted a series of sensitivity analyses with sub-samples similar to Sabherwal et al. [81]. The sub-samples were created using the following procedure. First, we dropped every third (SUB3), fifth (SUB5), seventh (SUB7), and eleventh and thirteenth response (SUB1113) from the analysis based on the identification number of the responses. We believe that the exclusion of the sample data based on the multiple of a prime number should reduce the possibility of overlapping dropped responses. Then, we generated covariance matrices based on each sub-sample. Second, a series of factor analysis based on the covariance matrices of the sub-samples were conducted. Third, the results and their goodness-of-fit indices were compared with each other. The results reveal that the goodness of fit indices for the three-factor structure are better than those for the one-factor structure for all the sub-samples. Thus, we conclude that the three-factor structure is robustly better than one-factor structure. The results of sensitivity analysis are included in Table B1 in Appendix B.

Table 3: Results of Factor Analysis for Distributive Fairness (λ_x)

Factor Loadings λ_x (t-values)		RA	PO	IAD
	RA1	1.41 (15.74)		
	RA2	1.07 (12.22)		
	PO1		1.47 (10.98)	
	PO2		1.38 (14.03)	
	PO3		1.74 (13.61)	
	PO4		1.66 (10.24)	
	IAD1			1.00 (9.82)
	IAD2			1.76 (10.67)
Correlations Φ (t-values)	RA			
	PACR	0.64 (11.85)		
	IAD	0.56 (8.83)	0.58 (8.78)	
RA [Resource Allocation]; PACR [Priority Assignment and Conflict Resolution]; IAD [Information Access Design]				
Comparison of Fit Indices				
	Three-Factor Structure	One-Factor Structure	Recommendation	References
χ^2/df	31.80/17=1.87	188.45/20=9.42	≤ 3.00	Wheaton et al.'s (1977); Carmines and McIver (1981); Segars and Grover (1993); Browne and Cudeck (1993)
RAMSEA	0.07	0.21	≤ 0.08	
SRMR	0.04	0.093	≤ 0.10	
CFI	0.98	0.77	≥ 0.90	
IFI	0.98	0.77	≥ 0.90	

Based on the three-factor structure of distributive fairness, a confirmatory factor analysis was conducted for all the constructs together to assess the measurement model and to test the convergent and discriminant validity. Table 4 presents the results of the factor analysis and reliabilities of all the variables. All items are found to load onto the designed factors, and the t-values of the loadings are significant.

The Cronbach's α of the variables range from 0.70 to 0.90, indicating that the measurements are reliable [70]. Average variance extracted (AVE) ranges from 0.61 and 0.84, which are above the acceptable level of 0.50, and composite reliabilities (CR) also range from 0.75 to 0.94, which are above the acceptable level of 0.70 [31]. Hence, convergent validities of the constructs are supported. The correlation matrix and square root values of AVEs for the variables used are presented in Table 5. Square root of each AVE for all the constructs is higher than their correlations with all other constructs, supporting discriminant validity [31].

Table 4: Results of Factor Analysis and Reliabilities

Factor	Items	Loadings	T-Value	Cronbach's α	A.V.E	C.R.
RA	RA1	1.49	18.13	0.86	0.73	0.84
	RA2	1.01	11.71			
IAD	IAD1	0.95	9.54	0.71	0.64	0.76
	IAD2	1.81	11.28			
PO	PO1	1.61	11.29	0.83	0.71	0.90
	PO2	1.35	13.93			
	PO3	1.90	14.25			
	PO4	1.47	10.83			
USISD	USISD1	1.28	15.47	0.90	0.61	0.86
	USISD2	1.45	13.52			
	USISD3	1.57	13.81			
	USISD4	2.05	14.42			
SrQ	SrQ1	1.99	13.22	0.88	0.84	0.94
	SrQ2	2.11	14.44			
	SrQ3	1.69	15.17			
SQ	SQ1	4.10	8.32	0.70	0.62	0.75
	SQ2	2.03	13.08			
IQ	IQ1	3.46	14.80	0.89	0.62	0.88
	IQ2	1.46	12.18			
	IQ3	3.32	13.84			
	IQ4	3.18	12.93			
	IQ5	1.39	11.34			
RA [Resource Allocation]; PO [Process Outcomes]; IAD [Information Access Design]; SQ [System Quality]; IQ [Information Quality]; SrQ [Service Quality]; USISD [User Satisfaction with IS Department]						

Table 5: Correlations among Constructs

	Mean	S.D.	Correlations*						
RA	4.87	1.52	***0.85***						
PO	4.73	1.20	0.59	***0.80***					
IAD	5.34	1.27	0.51	0.61	***0.84***				
USISD	4.63	1.34	0.56	0.62	0.27	***0.78***			
SrQ	5.35	1.05	0.37	0.62	0.33	0.67	***0.92***		
SQ	4.37	1.30	0.13	0.37	0.15	0.49	0.40	***0.79***	
IQ	5.43	0.95	0.19	0.38	0.20	0.48	0.42	0.78	***0.79***
* - Bold and Italic numbers on the diagonal of the matrix represent squared root of AVEs.									

Hypotheses Testing

In hypothesis 1, we proposed that distributive fairness in the IS context is likely to be composed of three factors: Resource Allocation (RA), Process Outcomes (PO), and Information Access Design (IAD). This hypothesis is examined based on the result of factor analysis along with validity and reliability analysis. As discussed earlier, the three-factor structure has shown better-fit compared to the one-factor structure. In addition, Cronbach's alpha(α)s and composite reliabilities of the three constructs are also acceptable. The square root of each AVE values for RA, PACR, and IAD is greater than the correlations between the construct and all other constructs [31]. Taken together, we believe that the three factor structure model optimally represents the concepts and the data. Thus, *Hypothesis 1, which proposed the three distinct sub-factors of distributive fairness, is accepted*.

After the factor analyses discussed above, structural equation models were analyzed to test the proposed model and a rival model. Figure 2 presents the overall results of the two emergent models. The diagram in the top part of Figure 2 presents the main research model based on independent effects of the three distributive fairness dimensions on IS quality factors and satisfaction with an IS department. In addition, as a rival model, we considered the effect of second-order distributive fairness based on the phi (Φ) matrix, which indicates a high level of correlations among the distributive fairness dimensions [93] that appear to be in line with Joshi's [48] initial proposal. The diagram in the lower part of Figure 2 depicts this rival model. In other words, the first-order factors (RA, PO, and IAD) are viewed to be reflective indicators of a second-order factor, distributive fairness (DF), which in turn influences IS quality factors and satisfaction with an IS department. Similar comparison was also employed in Tanriverdi [98] to evaluate the alternative models depicting a relationship between synergy (a multidimensional construct) and performance and between sub-dimensions of the synergy and performance.

As the diagrams in Figure 2 show, the main research model has a set of fit indices at an acceptable level (χ^2/df = 2.36, RAMSEA=0.08, SRMR=0.08, CFI=0.90, IFI=0.90) based on the recommendations of Segars and Grover [87], Carmines and McIver [15], and Browne and Cudeck [13]. Therefore, on the whole we believe that the main research model properly represents the sample data based on the overall fit indices.

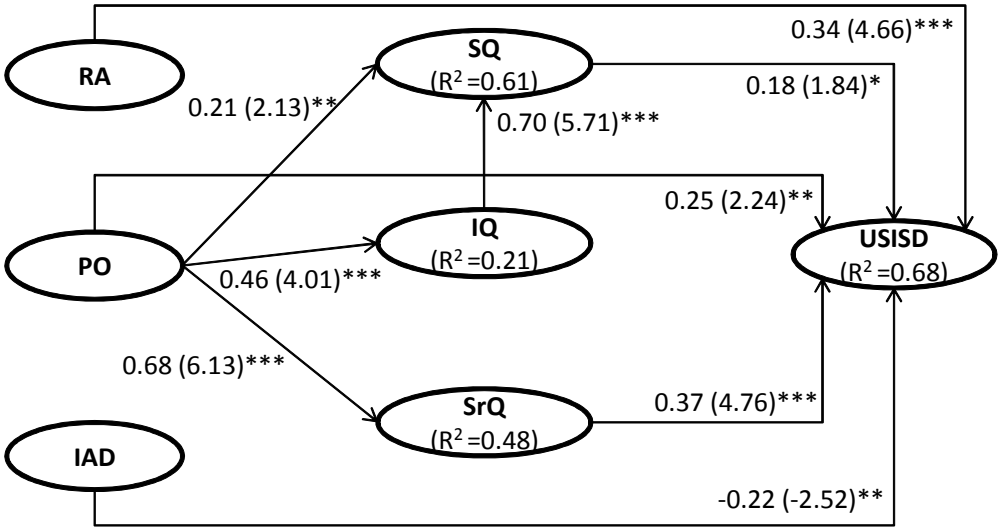
The rival model also has a set of fit indices at an acceptable level (χ^2/df = 2.47 and RAMSEA=0.08) based on the recommendations of Carmines and McIver [15] and Browne and Cudeck [13]. However, other fit-indices (CFI=0.88 and IFI=0.88) are not satisfactory based on Segars and Grover's [87] criteria. Thus, an overall comparison of fit indices (including CFI and IFI) between the two models suggests that the main research model is better than the rival model. As the main model shows a better-fit compared to the rival model, the remaining hypotheses are tested based on the main model.

Hypothesis 2 states that the three dimensions of distributive fairness (RA, PO, and IAD) would have different relationships with IS quality dimensions, such that RA, PO, and IAD would have the largest effect on system quality (SQ), service quality (SrQ), and information quality (IQ), respectively. Among three distributive fairness dimensions, PO has significant path coefficients to SQ (coefficient: 0.21, t-value: 2.13), IQ (0.46, 4.01), and SrQ (0.68, 6.13). As expected, the effect of PO on SrQ is the largest among the three information systems quality dimensions based on the size of path coefficients. However, RA and IAD do not have significant relationships with the three information systems quality dimensions, indicating no distinct relationships. Therefore, we conclude that *hypothesis 2 is partially accepted.*

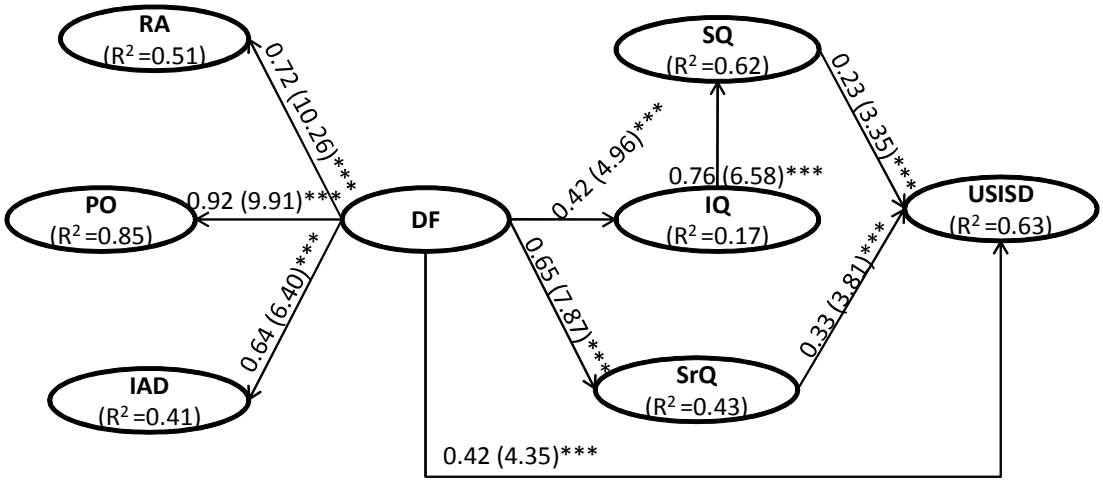
Hypothesis 3 suggests that the three distributive fairness dimensions (RA, PO, and IAD) may also positively affect USISD. As expected, RA and PO are found to positively influence USISD with path coefficients (t-value) of 0.34 (4.66) and 0.25 (2.24), respectively. However, IAD has a significant negative effect on USISD (coefficient: -0.22, t-value: -2.52), indicating a result opposite to the hypothesized relationship. Therefore, *hypothesis 3-1 and 3-2 are accepted whereas 3-3 is rejected*.

Hypothesis 4 proposes that information systems quality dimensions would influence user satisfaction with an IS department (USISD). As the figure shows, SQ and SrQ are found to directly affect USISD with path coefficients (t-value) of 0.18 (1.84) and 0.37 (4.76), respectively. But, IQ does not have significant influence on USISD. Therefore, *hypothesis 4-1 and 4-2 are accepted whereas 4-3 is rejected*. In addition, based on the modification indices (MIs) of 10.0 [28], an unhypothesized path from IQ to SQ (coefficient: 0.70, t-value: 5.71, MI=16.54) is found. This suggests that the perception of information quality may influence the perception of system quality. Though IQ does not have direct significant path to USISD, IQ is found to significantly affect USISD through SQ indirectly (coefficient: 0.13, t-value: 1.76). The implications of this result are further discussed in the next section.

Independent Effects of Distributive Fairness (Main Model)



Second-Order Effects of Distributive Fairness (Rival Model)



* p<0.1, **p<0.05, ***p<0.001

	Main Model	Rival Model	Recommendation	References
χ^2/df	436.81/185 = 2.36	485.99/197=2.47	≤ 3.00	Wheaton et al.'s (1977); Carmines and McIver (1981); Segars and Grover (1993) ; Browne and Cudeck (1993)
RAMSEA	0.08	0.08	≤ 0.08	
SRMR	0.08	0.09	≤ 0.08	
CFI	0.90	0.88	≥ 0.90	
IFI	0.90	0.88	≥ 0.90	

- Measurement models are not included in these figures due to space limit.
- Only significant path coefficients are given, with the t-values in parentheses.

Figure 2: The Emergent Models

In terms of the squared multiple correlation (R^2), the research model explains 61% of SQ, 21% of IQ, 48% of SrQ and 68% of USISD. The effect sizes, calculated with R^2-[p/(N-1)], are 59%, 19%, 46% and 65% for SQ, IQ, SrQ, and USISD, respectively, where p is the number of independent variables, N is the sample size, and R^2 is the total variance explained [83]. The effect sizes for SQ, SrQ, and USISD are large, and the effect size for IQ is medium based on Cohen's [18] categorization in terms of the significance of the product-moment r. These effect sizes are considered to be good for a model in behavioral research. Additionally, the research model has a conventional level of statistical power at 0.8 [18], given the Brian level of 0.05, sample size, and effect sizes[3].

Common method bias was assessed with three types of statistical tests recommended by prior studies (e.g., [8, 58, 76, 100]). Appendix C presents the results from the tests for common method bias. First, Harman's one-factor test was conducted. In this test the emergence of a single factor or one general factor that accounts for a large portion of variance without rotation suggests a common method variation [76]. As Table C1 in Appendix C shows, no single factor is identified, and the first factor accounts only for 38.28% of the variance. Second, Lindell-Whitney marker variable test [56] was conducted. In this test, the correlation of a marker variable with theoretically unrelated principal variables indicates common method bias [58, 100]. The test was conducted with a marker variable, which measured how users obtain information from their information systems (directly or via others). As shown in Table C2 in Appendix C, no significant relationships of the marker variable with principal constructs were found. Third, pairwise correlations among the constructs were examined. As shown in Table 5, the highest correlation among the constructs was 0.78 which is below the 0.8 threshold recommended by Bargozzi et al. [8]. Taken together, the threat of common method bias is not found to be an issue in this study.

DISCUSSION AND CONCLUSION

This paper indentified the importance of distributive fairness in users' evaluation of the IS department and IS products and services. It argued that IS distributive fairness has multiple dimensions, and the perceptions of unfair treatment in the dimensions may influence users' assessment of IS product and service quality and satisfaction with their IS department. Overall results of this study appear to support the argument.

In the IS context, Joshi [48] assessed users' distributive fairness perceptions by considering users' assessment of IS related outcomes relative to other users (or user groups), and identified distributive fairness as a single factor in the IS context. However, in our analysis, we found that distributive fairness yields three distinct dimensions, resource allocation (RA), process outcomes (PO), and information access design (IAD), which are correlated with each other. This result is in line with prior studies which identified different dimensions of distributive fairness (e.g., 6, 10, 11, 68, 71]). Hunton [39], Hunton and Price [41], and Hunton and Beeler [40] also considered different relevant dimensions in their experimental manipulation of procedural fairness on similar lines.

The results indicate that users evaluation of IS quality issues can be influenced by users' perception of (un)fair treatment. This result is similar to the findings in the prior literature that a perception of unfairness could influence a person's attitudes [5, 49], that users are likely to identify the objects for their reaction to the unfair treatment [54], which would be IS products and services in this context, and that a user's perception of fairness is related to his/her attitude toward IS [39]. More specifically, users' perception of the three dimensions of distributive fairness was partially found to have distinct relationships with information systems quality dimensions. Since users are generally directly engaged in interactions with the IS department during the processes such as conflict resolution, setting of priorities, and requesting changes to the system, any perceptions of unfair treatment in the outcomes of such processes (PO) appear to be very salient for users in influencing their attitudes, as confirmed by the results. However, the hypothesized positive main relationships from IAD to IQ, and RA to SQ were found to be insignificant. We believe that since users may have a priori knowledge of what they can retrieve from the IS based on their jobs and positions, they may not evaluate IS products and services to based on their perception of fairness on IAD. Similarly, if an organizational-level budget committee or resource allocation committee makes decisions about budget, computing resources, and system supporting staff, and users may be aware of such organizational policies, the cause of/responsibility for RA may not be associated with the evaluation of IS products and services.

We also found that users are likely to attribute (un)fair treatment to their IS department and staff. This result is similar to prior studies that these attitudinal changes are based on the attribution of unfairness as argued by Cohen [19]. Among the dimensions of

[3] According to Cohen [18], the sample size should be over 85 or 28 for medium or large effect size, respectively, to obtain the statistical power of 0.8 with the Brian level of 0.05.

distributive fairness, RA and PO were found to have direct effects on user satisfaction with an IS department (USISD). In line with Carr [16], which identifies relationships between fairness issues and satisfaction with IS staff, this study shows that users' perception of fairness would influence their satisfaction with an IS department in an organization. This result also seems to be congruent with traditional marketing studies which highlight the role of fairness as a determinant of satisfaction with a firm [88]. The influence of the two distributive fairness dimensions, RA and PO, was found to be as high as the traditional variables such as SQ and SrQ. This suggests that distributive fairness issues play a substantial role in shaping users' attitudes toward an IS department. One anomaly in the results is that the hypothesized positive relationship from IAD to USISD was found to be significantly negative. To investigate it further, we examined the scales used to measure IAD that were obtained from Joshi [48]. On closer inspection, we found that a higher score on the two scales used to measure IAD indicated that information access is same as others, but a lower score does not clearly imply a lower equity. Therefore, these scales should be improved in the future research.

In addition to elaborating the relationships of the three dimensions of distributive fairness with USISD, the results reveal that system quality (SQ) and service quality (SrQ) directly influence USISD, highlighting the role of systems and service quality in determining satisfaction with an IS department. However, we found that information quality (IQ) does not directly influence USISD; rather it affects SQ, and then indirectly influences USISD. In other words, users may perceive the system quality based on their perception of information quality. This result is somewhat different from prior studies, which primarily considered information quality and system quality independently (e.g., [27, 42, 66]), and which found an effect of system quality on information quality [107]. We believe when users find that information from system has a high level of quality, they may also perceive that the system has a good quality as well. Additionally, since users would directly experience the quality of information content, it seems reasonable that information quality should be a determinant of system quality. Especially, the last three studies also show a very high level of correlations between information quality and system quality (e.g. 0.71 in Iivari [42]; 0.85, 0.86, and 0.86 in Nelson et al.'s [66] three subsamples; 0.85 in Wixom and Todd [107]). We believe that the relationship between the two constructs should be interpreted carefully based on the context and the underlying constructs.

LIMITATIONS

Some limitations of the study should be kept in mind in interpreting the results. First, even though we measured perception of system quality (SQ), information quality (IQ) and service quality (SrQ) based on Ives et al's [45] scales, other similar measurements for these constructs (e.g., [16, 42, 66, 77, 107]) have been also employed. However, there seem to be differences in the measurements used in prior studies. For example, DeLone and McLean [27]) proposed that system quality is composed of adaptability, availability, reliability, response time, and usability, and information quality includes completeness, ease of understanding, personalization, relevance, and security. Iivari [42] employed flexibility, integration, response time, recoverability, convenience, and language as determinants of system quality, and completeness, precision, accuracy, consistency, currency, and format as determinants of information quality. Rai et al. [77] used precision, relevance, sufficiency, less errors, sufficient output options, helpfulness and accuracy as items for information quality, and two items related to ease of use as a surrogate of system quality. More interestingly, Wixom and Todd [107] proposed that information quality is influenced by completeness, accuracy, format, and currency, and system quality is affected by reliability, flexibility, integration, timeliness, and accessibility. However, the results of data analysis indicate that the two constructs, completeness and format, have higher correlations with system quality compared to information quality, suggesting that these constructs may be a part of the system quality. Additionally, the construct 'integration' had a higher correlation with information quality compared to system quality. In this paper, we also selected items based on these prior studies; but in order to keep the parsimony of the model, we used two items for system quality, three times for service quality, and five items for information quality. The measurement issues related to the three constructs of IS quality issues may be further examined in future studies.

Second, fairness in information access design (IAD), a sub-factor of distributive fairness, was negatively related to USISD. As discussed earlier, this result may be attributed to the framing of the scales for measuring fairness in IAD. The scales for this construct need to be refined in future studies. Third, our test of the updated DeLone and McLean [27] model was incomplete at the expense of the parsimony of the research model, lacking the constructs of information systems use, and net benefits (individual and organizational impacts). Thus, future studies need to incorporate net benefits of information systems with distributive fairness issues and

other information systems success factors. Fourth, the analysis was based on cross-sectional data obtained from large organizations in the mid-western US, therefore, the limitations of cross-sectional data analysis and limits to generalizability should be kept in mind while interpreting the results.

IMPLICATIONS FOR RESEARCHERS

This study identifies the important role of distributive fairness issues in determining users' evaluation of IS products and services, and the influence of these evaluations on user satisfaction with an IS department (USISD). It appears that users' perception of distributive fairness is as important as the traditional issues, such as information quality and system quality in determining USISD. The study also provides insights for future IS research dealing with fairness issues in IS management.

Collquit [21] and Collquit et al. [22] identified procedural, distributive, interactional, and interpersonal fairness as four distinct factors of fairness. Future research should attempt to provide conceptual integration, which permits consideration of different fairness aspects under a unified framework. Carr [16] identified the four factors which make systemic service fairness, though the scales were directly adapted from the management discipline. Joshi [48] developed instrument for measuring fairness in the IS context and focused on distributive fairness, while the scales for the measurement of procedural fairness consisted of only two items. Therefore, the future research should also focus on the development of scales to measure other types of fairness as noted above. Collquit et al. [22] contended that interpersonal and interactional justice can be the antecedents of procedural justice. Therefore, it may also be useful to examine the inter-relationships between different types of fairness in the IS context.

In terms of the research scope, the future research may also examine pro-actions for distributive fairness, rather than just reactions to unfairness [34]. In the past, IS studies have mainly focused on the relationship between the perception of fairness and its derivative outcomes. Future research may investigate the role of informational and procedural fairness in mitigating the perceptions of unfair treatment among users.

IMPLICATIONS FOR PRACTITIONERS

Fairness in process outcomes was found to be the most important dimension among the three types of distributive fairness identified in the study. IS staff should be sensitive in acting and being viewed as acting fairly while engaged in setting priorities of IS activities for different user groups. They should also act as and be viewed as impartial arbitrators in attempting to resolving conflicts among users. Fairness in resource allocation was also found to play a role in determining USISD. Thus, when an organization implements IS, policies for allocation of IS resources such as hardware, software, and staff should be made impartially. We believe identification of these issues will help sensitize IS professionals to relevant fairness issues and help them foster better user attitudes. It can be added that communicating the rationale for their actions effectively to user groups may be important in managing users' fairness perceptions.

Another implication for IS professionals is the identification of the importance of service quality for users in determining USISD. Traditionally, the importance of information and system quality is recognized by IS professionals, who are likely to be generally focused on technical excellence. The results of this study indicate that service quality also plays an important role in users' satisfaction with an IS department. Therefore, IS professionals have to pay particular attention to maintaining good relations with users and being sensitive to human relations aspects, besides technical excellence. IS management can provide training and sensitize IS professionals to the important role of issues identified in this paper to help them foster better user attitudes toward their activities and achieve higher USISD. In addition, IS departments should provide clear organizational guidelines related to IS fairness issues to users to reduce their misattributions of (un) fairness to an IS department and IS staffs.

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APPENDIX A: INSTRUMENTS USED

Table A1: Finalized Items Used in the Instruments

Variables (Sources)	Items Used	
Distributive Fairness in Resource Allocation (Joshi, 1989)	RA1	Compared to other similar user groups, computing resources (e.g., terminals, printers, and software packages) have been provided to my department on a fair basis.
	RA2	Compared to other similar user groups, the budget for computing has been allocated to my department on a fair basis.
Distributive Fairness in Process Outcomes (Joshi, 1989)	PO1	Conflicts with other users about the design of systems have been handled on a fair basis.
	PO2	Compared to other similar user groups, priorities for development of information systems for my department have been assigned on fair basis.
	PO3	Compared to other similar user groups, the information systems department handles our requests for changes in the systems on a fair basis.
	PO4	Staffs in the information systems department behave impartially and fairly towards my department.
Distributive Fairness in Information Access Design (Joshi, 1989)	IAD1	We are permitted to obtain the same computer based information that other similar users are allowed to obtain.
	IAD2	Our ease of access to the computer based information is the same as available to similar user groups
User Satisfaction with IS Department (Ives et al., 1983)	USISD1	How do you feel about the MIS groups in your organization in terms of its ability to meet the information needs of your area of responsibility?
	USISD2	How do you feel about the MIS groups in your organization in terms of its ability to meet the requirements of all the users they serve?
	USISD3	How do you feel about the efficiency of the MIS group in your organization?
	USISD4	How do you feel about the effectiveness of the MIS group in your organization?
System Quality (Ives et al., 1983)	SQ1	Flexibility of systems
	SQ2	Confidence in systems
Service Quality (Ives et al., 1983)	SrQ1	Relationship with the MIS staff
	SrQ2	Attitude of the MIS Staff
	SrQ3	Communication with the MIS staff
Information Quality (Ives et al., 1983)	IQ1	Reliability of output information
	IQ2	Relevancy of output information
	IQ3	Accuracy of output information
	IQ4	Precision of output information
	IQ5	Completeness of output information

APPENDIX B: SENSITIVITY ANALYSIS

Table B1: Results of Sensitivity Analysis

	Three-Factor Structure				One-Factor Structure			
Sub-Samples	**SUB3**	**SUB5**	**SUB7**	**SUB1113**	**SUB3**	**SUB5**	**SUB7**	**SUB1113**
χ^2/df	24.32/17 =1.43	24.97/17 =1.47	31.11/17 =1.83	36.64/17 =2.16	143.94/20 =7.20	175.20/20 =8.76	170.80/20 =8.54	184.36/20 =9.22
CFI	0.99	0.99	0.98	0.97	0.78	0.73	0.77	0.73
IFI	0.99	0.99	0.98	0.97	0.78	0.73	0.78	0.73
RAMSEA	0.05	0.05	0.07	0.08	0.22	0.22	0.21	0.22
SRMR	0.04	0.04	0.04	0.04	0.09	0.10	0.10	0.10

APPENDIX C: ANALYSIS OF POSSIBLE COMMON METHOD BIAS

Table C1: Total Variance Explained without Rotation - Harman's one-factor test

	Initial Eigenvalues		
Component	**Total**	**% of Variance**	**Cumulative %**
1	8.422	38.281	38.281
2	2.973	13.512	51.793
3	1.791	8.143	59.936
4	1.312	5.965	65.901
5	1.035	4.704	70.605
Extraction Method: Principal Component Analysis.			

Table C2: Result of Lindell-Whitney Marker Variable Test

Pearson Correlation (Significance) with a Marker Variable*	
IQ	-.05 (.51)
USISD	-.12 (.87)
SrQ	.01 (.89)
SQ	-.01 (.95)
RA	.08 (.28)
PO	.00 (.97)
IAD	-.01 (.87)
* the way for users to obtain information from systems	

APPENDIX D: TURNER COLLEGE EPISODE[4]

Turner College of Business is one of the leading US educational institutions. Since the last few years it has operated a desktop replacement program (DRP) for full time faculty that is financed by the university to provide a new computer to the faculty every three years. Some of the older machines are recycled for use by part time faculty, staff and student advisors.

Jason was employed to install computers and provide IS technology support for the college. He was authorized by the Dean to consider user requests and refurbish or replace older computers used by staff and part time faculty as needed. Some of the computers used by staff and part time faculty were replaced by Jason based on their age and performance. To save on costs, Jason arranged to refurbish older computers to the extent possible. One of the part time staff members, Becky complained to the Dean that Jason provided only broken machines to them, though these machines were still operating well and he was following the organizational policy. Becky also complained about the unfair treatment by Jason, who provided other staff members (other full time workers) better machines.

Brian developed and implemented a web-reservation system for the college. This system permitted students to schedule advising appointments. During the implementation, Becky found a glitch in the system. Becky complained to Brian that since Jason provided her bad machines, the system was not working properly on her machine. However, later on it was found to be a programming problem. In addition, during the implementation of the web-reservation system, Becky requested Brian to grant her an administrative authority to see and modify student reservations, though Becky's role required her only to view the reservations. Since Becky was a part time employee and did not advise the students regularly, Brian denied her request as per organizational rules. Though Becky felt that as she is frequently advising students during the absence of a full time advisor, she should also have the same information access privileges. Becky also participated in discussions about the implementation of the new system; however some of her requests about user interface were not accepted. Upon installation of the system, Becky frequently complained that the system was not working properly and tried to influence other users as well. Becky also resisted using the system and complained about Jason and Brian to the Dean and the Associate Dean.

This episode illustrates how users may experience unfair treatment in an IS context. Becky felt unfairly treated in information access (IAD), implementation process outcomes (PO), and allocation of computer resources (RA). It also illustrates the likely negative influence of unfair distributive outcomes on user attitudes, and poor user evaluation of IS staff when users perceive unfair treatment. Similar perceptions of unfair treatment can occur across departments as well, e.g., among accounting, finance, and purchasing.

[4] This episode is based on one of the authors' direct experiences during an implementation at a university. The names have been changed to ensure anonymity.