Applying UTAUT and Fuzzy Dematel Methods: A New Legal Aid Administration System

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Abstract: A hybrid UTAUT and Fuzzy Dematel Method is proposed in assessing the perception of accepting the new electronic Legal Aid Administration (eLAA) system by employees of Legal Aid South Africa. Information technology acceptance research has in many respects provided insight to decision-making on reviewing user acceptance. Legal Aid SA's employees' perception measured by their response of assessment is useful information on users' attitude of accepting the eLAA system. Therefore, this study aims to measure the main determinants of intention and usage of the new system by users using the Unified Theory of Acceptance and Use of Technology (UTAUT). Further, we identify the cause-and-effect factors of acceptance and suggest the importance of factors using the Fuzzy Decision-Making Trial and Evaluation Laboratory (Dematel) method. The findings of this study suggest that the UTAUT dimensions of Performance Expectancy has high direct influence on acceptance of the eLAA system by Legal Aid SA employees than other variances. Alternatively, Effort Expectancy (EE) dimension is in the overall having the least power of direct influence on using the eLAA system. Notably, both the Social Influence and Facilitating Conditions have low direct influence in predicting the attitude of using the eLAA system. The findings of this study are useful in assisting the management of Legal Aid SA to gain insight into preferred ways to introduce automated systems that are perceived useful and acceptable amongst employees.

Keywords: UTAUT Model, Fuzzy Dematel, Legal Aid Administration, Legal Aid South Africa.

1. Introduction

In this study, we make use of two methods to predict the responses of users after introduction of a new system, the electronic Legal Aid Administration (eLAA) system in a public entity, Legal Aid South Africa (Legal Aid SA). The development of information technology-based administration is a valuable intervention for effecting efficiencies of administering organizational resources. Users of information technology systems are eager to use systems which are responsive to their needs while advancing the cause of an organization. Many researchers have shown that there are critical factors that influence successful implementation of a new or modified system. Also, that by involving users in the development of information technology systems the important factors which have impact on system performance can be enhanced to benefit users, the work setting and business (Wong & Tate, 1999). Pre-eminently, user participation can be used as a tool to overcome fears and resistance to change in methods and procedures of executing tasks while promoting acceptance of a new system (Jiang et al., 2000; Chang et al. (2013). Alternatively, a directive change management approach which is complemented by suitable training, documentation of new processes and rewarding innovative ideas can be used to implement a new / improved technology system (Somers and Nelson, 2004; Shang, 2012). We suggest that a suitable managerial intervention is an important lever to induce commitment to use a new system intended to bring innovative processes and improved flow of information.

This paper takes an approach of considering user participation and the introduction of a new information technology as fundamental to successful execution of a modernized work system that leads to improved user satisfaction. The UTAUT model has been used to measure user satisfaction with the new information technology system. Venkatesh et al. (2003) are accredited with being the reviewers and integrators of the theories involving, Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of planned Behavior (TBP, Social Cognitive Theory (SCT), and a

combined theory of planned behavior/technology acceptance model (C-TPB-TAM), amongst others to establish a unified perspective of user intentions and acceptance of an information technology system (Dwivedi et al., 2019). This paper uses the UTAUT model and its variables to assess the effect on user intention of the eLAA system of Legal Aid SA. The factors of UTAUT Model have been used as input towards the crystallization of users' perceptions and acceptance of information technology by application of the Fuzzy Dematel method (Javidnia et al., 2012). By using the Fuzzy Dematel logic from a fuzzy rating scale-based questionnaire researchers are able to analyse the cause-and-effect of the UTAUT-based factors from the analyzed data. Also, the outcome of the logic helps in prioritizing the impact of the UTAUT factors to provide more insight into the effect of user perception and acceptance. This paper is a model of success in applying the Fuzzy Dematel method using the UTAUT factors. The findings of the study of the post-implementation of the eLAA system in Legal Aid SA are predicted to facilitate valuable decision-making regarding future ways of user involvement when enhancing automated work processes or introducing a new system in Legal Aid SA.

2. Literature Review

2.1. Legal Aid Administration and Information Systems

Legal Aid services are generally known as the supply of legal assistance /counsel by different governments, their agencies or non-government organizations to those who cannot afford to appoint a lawyer while in need of court representation or seeking legal representation to resolve legal aid issues. Legal Aid SA is a National Public Entity which has a Constitutional and legislative mandate to provide legal services to needy and vulnerable persons. The institution expresses organizational values of commitment to professionalism and service excellence. One of the important competence of employees is to understand business administration processes and systems (Wu and Lee, 2007). David McQuoid-Mason (2000) in reflecting on the impact of Legal Aid SA post the democratic state suggests models of delivery are necessary to advance the effectiveness of the legal aid system in South Africa. He further argues that increased demand for legal aid call for the requisite administrative structures to support the legal aid scheme. Besides, Legal Aid SA was candid in stating that it experienced difficulties in administrative control environment and management skills and competencies (Legal Aid Board, 2003). Subsequently, an automated legal aid administration system, Ad-Infinitem System, was introduced in 2004 to assist in procuring the services of external legal practitioners, known as judicare practitioners, in support of a salaried legal practitioners' system. That covers a response to a tailored supply chain management system and management information system which is reliable and predictable (Legal Aid SA, 2017). The strategic focus of management of Legal Aid SA continued to strive towards a delivery and business processes that are efficient and effective in client services. The inherent processes of the legal aid system involve the legal aid applications by clients and accreditation of instructions to external legal practitioners. As a result, accredited legal practitioners constitute a list of prospective suppliers of legal aid services which is done on a rotational basis to enable fairness of allocation of client's legal instructions. Legal Aid SA has adopted an electronically-based administration system to facilitate smooth operations of its legal services. The electronic Legal Aid Administration system (eLAA) is thus a successor of the legacy system, Ad-Infinitem system, and is intended to augment the strategic performance of the organization's legal and financial processes (Legal Aid SA, 2020). Importantly, the successful execution of legal administration requires that employees of Legal Aid SA demonstrate proficiency in operating the eLAA system to increase work productivity.

Chiefly, technology use in legal service administration is for case management. Moreover, management of a legal aid service is generally aimed at access to justice initiatives to empower and educate citizens and to communicate with lawyers through using information and communication technologies. Amongst others, using SMS-based technology to facilitate pertinent information on legal matters to lawyers and clients, self-help portals for legal advice, and the application of the Global Positioning System (GPS) to synchronize locations for legal administration related activities. Also, remote and real-time access by mobile phones for collection and transmission of critical information on legal matters and using internet, email and websites has become a valuable vehicle for access of legal aid information by all stakeholders (Gordon, 2012). Legal Aid SA's eLAA project is deemed as a tool to respond to many of the afore-stated technologies and its primary modules for legal case management include, the capturing of client legal aid applications, evaluating the client applications through means test, ability to allocate legal tasks to subordinates, and capability to account for finalisation of legal matters after court processes. Additionally, new legal matters are allocated to accredited judicare practitioners by SMS-based technology. The taxation of legal costs process and payments to judicare practitioners incorporate the GPS mapping for accurate records on payment claims for travel distances covered.

Virtual Private Network by internet connectivity to 134 offices located across the country is meant to facilitate stabilized daily operations of legal matters while enabling a responsive procurement of legal aid services for the benefit of judiciary practitioners. The implications of this modernised legal aid system require tech-savvy employees who are adaptive to new technology necessary to capacitate an organization to effectively conduct its activities. Accordingly, it is suggested that the eLAA system need to be a flexible and suitable information system that is responsive to employee needs. By accepting the eLAA system which is a new information technology system in Legal Aid SA, the eLAA system would become indispensable for improved organizational performance. Therefore, this study is important in assessing the level of acceptance of the eLAA system as a new technology available for users.

2.2. Technology Acceptance Models

Davis (1989) developed the Technology Acceptance Model (TAM) in support of the Theory of Reasoned Action (TRA) that describes the prediction of user's acceptance of information technology (IT) which is a measure of behavioral intentions of users. The two key determinants of Davis's TAM Model are defined as perceived *usefulness* being "the prospective user's subjective probability that using a specific application system will increase his/her job performance within an organizational context" (p. 985), while the *perceived ease of use* is "the degree to which the prospective user expects the target system to be free of effort" (p. 985). Alharbi and Drew (2014) and Surendran (2012) assert that TAM is widely used to measure technology acceptance of information systems and technology using these two factors deemed to be more applicable to predict actual computer system use behaviors by individuals. However, the incontestable importance of TAM factors as a tool of prediction of individual user behavior is also quintessential in structuring the individual profiles within a workplace. Agarwal and Prasad (1998) suggest that individual differences would be of benefit when organising profiles of individual users to assess acceptance of new technology in a work setting. Besides, the primary two factors of TAM are influenced by external factors such as usage experience of technology, job relevance, gender, facilitating conditions, system availability, volunteerism, and social factors such as skills and language also assumed as determinants of behavior (Alharbi and Drew (2014; Surendran, 2012). Accordingly, Goodhue and Thompson (1995)'s claimed that task and technology is necessary to increase the prospect of use and improved performance in efficiency and effectiveness of individuals. Also, that a good Task-Technology Fit (TTF) would probably increase using technology while improving performance as a result of the technology satisfying the task needs of users. Still, Technology Readiness (TR) as inclination to accept and use a new technology to perform a work task demand employee cooperation and competent management for a positive effect on the organization (Parasuraman and Colby, 2001). That would partly support Davis' (1989)'s TAM which showed that when using new technology individuals must believe in its ease of use or requisite for minimal or no effort. This study has along previous research adopted the inclusion of TAM factors to assess the acceptance of the electronic Legal Administration system based on the UTAUT Model.

The UTAUT Model is used to facilitate the assessment of perceptions and intentions of users of an information technology system. The four primary variables of the Model are a foundation to measuring effect of Effort Expectancy (EE), Performance Expectancy (PE), Social Influence (SI), and Facilitating Conditions being direct predictors of intentions in utilization of a system (Venkatesh et al., 2003). The EE and PE are conceived as similar representations of the TAM's constructs of the *perceived ease of use* and *perceived usefulness*, respectively and may be regarded as Information Technology determinants (Dwivedi et al., 2019). Alternatively, SI and FC constructs are considered to originate from Social Cognitive Theory, Motivational Model, the Theory of Planned Behavior (TPB) and Model of PC utilization. According to Venkatesh et al. (2003) SI is defined as the degree to which an individual perceives, that important others believe he or she should use the new system, while FC is explained as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. Both SI and FC may be considered as organizational factors which impact on individual behaviors (Dwivedi et al., 2019; Rahi et al., 2019). Gender, Age, Experience and Voluntariness of use have been used as moderators of the primary variables (Venkatesh et al., 2003). The combination of the primary variables and the associated moderating variables are deemed to strengthen the predictability of efficiency to 70% of the variance in behavioral user intention and 50% in using information technology (Venkatesh et al., 2003; 2012). Along similar studies, in this research study the UTAUT theory was extended with additional three dimensions of *Work Experience (WE)*, *Gender* and *Attitude of Use*, to consolidate the individuals *Behavioral Intention to Use*, being expediency of deciding to use the eLAA technology as indicated in Figure 1. In our case *Attitude of Use (AU)* replaced *Voluntariness of use* since employees of Legal Aid SA have no latitude of choice of usage of the eLAA system. This is along Dwivedi et al.'s (2019) argument that were there is mandatory directive from senior management to use of an Information Technology system voluntariness has no leeway. Also, that AU is deemed as a perceptual reaction to using a system.

The additional UTAUT variables are three dimensions of (1) Occupational Group (OG), (2) Responses by Regional Offices (RO) and (3) Size of Local Office (SO). Our *Occupational group* variance represents an external factor of *job relevance* which is deemed to influence the two factors of TAM. The RO and SO variances may be viewed as organizational factors related to Facilitation Conditions variance. The reason for adding these latter dimensions is because the eLAA system is widely dispersed and used by users of the different occupational groups in small, medium, and large offices. Ultimately, along the UTAUT approach it is expected that the individual's decision to use the eLAA technology would translate into *Actual System Use* of the eLAA system since attitude towards use has a direct effect on actual use (Davis, 1989; Venkatesh et al., 2013).

Figure 1: The UTAUT Model

UTAUT Model was applied to studies associated with business which related to professional activities and Information Technology (Dwivedi et al., 2019). The practical application of the UTAUT theory in explaining the information technology system used indicates that some factor relationships may neither be suitable nor relevant to all contexts. In contrast, others may play an important role in predicting attitude of use (Dwivedi et al., 2019).

2.3. Fuzzy Dematel Method

The Dematel method was firstly proposed by Battelle Institute in 1971 when addressing the Natural Sciences and Humanities Research Plan (Javidnia et al., 2012). The conventional Dematel method was successfully tested to assess factor relations, but it had to be complemented with the fuzzy set theory to address the deficiency of crisp values and subjectivity of human judgement (Ocampo et al., 2019). The fuzzy Dematel Technique clarifies the complex relationship of UTAUT factors by explaining the effect of each factor and the importance thereof when compared with other factors to assist managers in effectively executing technologies (Javidnia et al., 2012). Since the factors like those of the UTAUT in a complex system has a direct / indirect relationship, decision-makers could find it problematic to evaluate distinct effects from each factor within a system (Liou & Tzeng, 2007). The Dematel technique is graph theory-based to facilitate analysis of multiple measurement criteria by decision-makers into cause-and-effect groupings that results in simpler causal relationships (Chen & Chen, 2010). This technique was applied successfully in different contexts like management systems, electronic learning evaluation, and knowledge management (Kuo and Liang, 2011; Javidnia et al., 2012). The Fuzzy Dematel has also been successfully applied in assessing acceptance of new technology in a work environment where managerial control was critically important (Javidnia et al., 2012; Wu and Lee, 2007). In addition, the technique was positively integrated with other analysis to enrich the interpretation of data in a causal relationship (Javidnia et al., 2012; Ocampo et al., 2019). In following the fuzzy logic organizations could solve business dilemmas by accepting decisions of a collective of experts with knowledge, skill and experience in the area of concern (Altuntas and Yilmaz, 2016).

3. Methodology

This study is based on the UTUAT model of Venkatesh et al. (2003) with the purpose of determining the level of strength of predictors being EE, PE, SI and FC on the behavioral intention by users of the eLAA system in Legal Aid SA. The study further uses the Fuzzy Dematel Technique to analyse the causal relationship between the factors of the UTAUT Model. The survey instrument was designed by using Google Forms. Subsequently, the survey instrument was distributed online to 2426 employees of Legal Aid SA and was administered by using the Google Forms platform. The users of the eLAA system responded through clicking a suitable box as indication of their choice for each statement that seeks a response. There were 1223 respondents, being a 50.4% return rate and therefore this sample of respondents is deemed sufficient to be generalized to the 2426 population of Legal Aid SA.

3.1 Reliability analysis for the scales using Cronbach’s Alpha

All the 19 questions used a 5-point Likert item incorporating ratings from (1) “Strongly Disagree”, (2) “Agree”, (3) “Neither Agree nor Disagree”, (4) “Agree”, and (5) “Strongly Agree”. A Cronbach’s Alpha testing in Microsoft Excel (see Table 1) was conducted for the 19 items giving a value outcome of 0,84 which indicates that the survey instrument scale used is in general reliable and has internal consistency of good. However, the analysis of the Cronbach’s Alpha indicates that the measuring scales of the UTAUT construct factors’, Performance Expectancy (PE), 0,89, Social Influence (SI), 0,72 and Attitude of Use (AU), 1,00 seem to have a good degree of reliability when compared to that of Effort Expectancy (EE), 0,49, and Facilitating Conditions (FC), 0,56. The standard reliability of computed statistics for Cronbach’s Alpha is $\geq 0,70$. EE (0,49) has less than 5 items and it is acceptable for its Cronbach’s Alpha to be at a low level while FC (0,56) has poor internal consistency of $0,5 \leq \alpha \leq 0,6$ (Hilton et al., 2014, pp. 356).

Table 1: Reliability Analysis (n=1223).

UTAUT Construct	Cronbach’s Alpha	Number of Items
Effort Expectancy (EE)	0,49	4
Performance Expectancy (PE)	0,89	5
Social Influence (SI)	0,72	5
Facilitating Conditions (FC)	0,56	5
Attitude of Use	1,00	5
The overall survey instrument	0,84	19

3.2 Pearman’s Correlation Analysis

By using Pearson Correlation Coefficient technique in MS Excel version 10 we assess the strength of the linear relationship between EE, PE, IS, and FC. The Pearson correlation coefficient (*r*) ranges from +1 to -1 with (+) / (-) values indicating direct / inverse (negative) relationship between variables while zero indicates no relationship. In general, (*r*) of > 0.90 is considered “very high” relationship, (*r*) of 0,70 – 0,90 is “strong”, (*r*) of 0,40 – 0,70 is “moderate”, (*r*) of 0,30 – 0,40 is fair (mild/low), while (*r*) of <0,20 is regarded as “very weak / negligible” relationship (Munro, 2005; Wegner, 2007). This study used the standard level of 5% significance ($p < 0,05$) in concluding that there is evidence of a relationship between tested UTAUT variables. In this study, the extracted average variance (see Table 2) shows that EE have a moderate influence on PE, FC and AU while having a very weak relationship with SI. PE is fairly related to SI, moderately related to FC, and have a strong relationship to AU. SI is statistically insignificant in predicting EE, PE and AU though moderately influence FC. Facilitating Conditions (FC) have a consistent, significant influence on other factors, EE, PE, SI and AU (all at ($>0.4, p < 0.05$)). In the main, EE ($>0,4$) has a moderate effect on AU, SI (0,3) is in general relatively insignificant in predicting AU, and PE ($>0,7$) and FC ($>0,5$) are statistically significant in predicting Attitude of Use (AU) of the eLAA system.

Table 2: Pearman Correlation for n=1223 (Extracted Average Variance)

	Occupation	Length-Work	Gender	Regional-Office	Size-Office	EE	PE	SI	FC	AU
Occupation	1									
Length-Work	0,091467	1								
Gender	-0,09252	0,117568	1							
Regional-Office	0,074047	0,016509	-0,04316	1						
Size-Office	0,026857	0,076202	-0,03559	-0,01524	1					
EE	-0,01569	0,068593	0,022874	-0,02913	0,00402	1				

PE	0,013977	-0,09939	0,000861	-0,08393	-0,04998	0,476211	1			
SI	-0,09225	-0,13892	0,040042	-0,00593	0,022459	0,230946	0,348438	1		
FC	0,04646	0,006916	0,008027	-0,07959	-0,04144	0,434337	0,466347	0,423218	1	
AU	0,101581	0,018056	0,005357	-0,06365	-0,06495	0,455063	0,722203	0,315117	0,503604	1

2 tailed significances at 0.05.

Alternatively, *Occupation Group (OG)* has an insignificant inverse effect on EE (-0,015) and SI (-0,09) and insignificant effect on PE (0,014), FC (0,046) and AU (0,101). *Length of Work or Work Experience (WE)* has insignificant negative relationship with PE and SI and no significance with EE, FC and AU. *Gender* is consistently having no significant relationship with all main UTAUT variances (EE, PE, SI, FC and AU). Differently, *Regional Office (RO)* has a steady inverse against all main UTAUT variables. Same with *Size of Office (SO)* except that it shows no significant relationship with EE and SI. This implies that some moderating variables (OG, WE and Gender) have no significant relationship to AU. RO and SO have negative relationship against Attitude of Use (AU), although not significant. SI have insignificant changing effects with different variables except with EE and PE showing a fairly low relationship. FC has a moderate effect of >0,4 on EE, PE and SI and a negligible relationship of <20 with demographic factors. This implies that, the FC could have a moderate effect on employees' confidence and their performance.

3.3 Using the Fuzzy Dematel Technique

3.3.1 The Fuzzy Dematel Process

This study followed the following Fuzzy Dematel steps to find out the degree of importance and relation of criteria used. Experts' involvement were 13 individuals who formed the Project Team of developing the eLAA system and consists of the eLAA Project Manager, 5 Heads of Local Offices, and 1(one) each of Financial Manager, Candidate Legal Practitioner, Computer Audit Manager, Business Application Software Manager, Legal Manager, IS Security Assurance Officer, and Syspro Project Manager. They all assisted in filling the Fuzzy Dematel questionnaire by evaluating criteria of accepting the eLAA system. Their summarised anonymous profiles are detailed in Appendix B: Expert Profiles, covering job descriptions, professional qualifications, relevant work experience and gender. All the 13 experts completed a questionnaire of a linguistic variable fuzzy scale shown in Table 3 below, which is along with the formulation and application in a Fuzzy Dematel analysis by Wu and Lee (2007).

Table 3: Fuzzy Scale

Code	Linguistic terms	L	M	U
1	No influence	0	0	0.25
2	Very low influence	0	0.25	0.5
3	Low influence	0.25	0.5	0.75
4	High influence	0.5	0.75	1
5	Very high influence	0.75	1	1

The direct relation matrix (Table 4) generated in Fuzzy Dematel (Step 1) was used as an input in Fuzzy UTAUT by using the five UTAUT factors (EE, PE, SI, FC and AU) and translating them to a matrix of direct relationship of Fuzzy Dematel factors (D₁, D₂, D₃, D₄ and D₅). Subsequently, the fuzzy direct-relation matrix was Normalized (Step 2), the fuzzy total-relation matrix was calculated (Step 3), and crisp values were determined by Defuzzifying the factors (Step 4) as shown in Table 5. The threshold value for factors relations was set at equal to 1.3551.355 (Step 5) and enabled the calculation of the internal relations matrix

Table 4: The direct relation matrix

	Effort Expectancy	Performance Expectancy	Social Influence	Facilitating Conditions	Attitude of Use
Effort Expectancy	(0.000,0.000,0.000)	(0.385,0.615,0.808)	(0.308,0.538,0.769)	(0.404,0.635,0.827)	(0.346,0.577,0.808)
Performance Expectancy	(0.500,0.750,0.923)	(0.000,0.000,0.000)	(0.481,0.712,0.904)	(0.500,0.750,0.942)	(0.481,0.731,0.904)
Social Influence	(0.500,0.731,0.904)	(0.519,0.750,0.904)	(0.000,0.000,0.000)	(0.519,0.750,0.904)	(0.500,0.731,0.904)
Facilitating Conditions	(0.481,0.731,0.923)	(0.462,0.712,0.904)	(0.404,0.654,0.865)	(0.000,0.000,0.000)	(0.462,0.712,0.904)
Attitude of Use	(0.519,0.769,0.942)	(0.500,0.750,0.923)	(0.481,0.731,0.904)	(0.481,0.712,0.885)	(0.000,0.000,0.000)

3.3.2 Results

The model of significant relations is presented in the following table.

Table 5: The crisp total- relationships matrix by considering the threshold value

	Effort Expectancy	Performance Expectancy	Social Influence	Facilitating Conditions	Attitude of Use
Effort Expectancy	0	0	0	0	0

Performance Expectancy	1.481	0	1.382	1.438	1.414
Social Influence	1.472	1.425	0	1.432	1.409
Facilitating Conditions	1.449	1.396	0	0	1.384
Attitude of Use	1.483	1.429	1.384	1.43	0

Ultimately, the interpretation of the eLAA post-implementation Fuzzy Dematel results are explained by Table 6: The Final Output, and its associated Cause-Effect diagram, Figure 2.

In Table 6: The Final Output, the sum of each row and each column of T (in Table 5 above) represented by the sum of rows (D) and columns (R) were calculated as follows:

$$D = \sum_{j=1}^n T_{ij}$$

$$R = \sum_{i=1}^n T_{ij}$$

The values of D+R and D-R are calculated by D and R, where D+R represents the degree of importance of factor I in the entire system and D-R, which are termed relations, represent net effects that factor I contributes to the system. The positive or negative value of the relation factor i is either assigned as a cause or an effect.

In turn, the coordinate positions of (D + R) and (D – R) is explained by 4 types, being:

- A large (D+R) and a positive (D-R), indicating that attributes are causes and driving factors for solving problems;
- A small (D+R) and a positive (D-R), indicating that attributes are independent and have low influence on few other attributes;
- A large (D+R) and negative (D-R), indicating effect-type attributes which are the core problems to be solved though they cannot be directly improved;
- A small (D+R) and negative (D-R), indicating that the attributes are independent and can be influenced by only a few other attributes.

Table 6: The Final Output

	R	D	D+R	Rank)1(	D-R	Rank)2(
Effort Expectancy	7.046	6.152	13.198	5	-0.894	5
Performance Expectancy	6.775	6.979	13.754	1	0.204	3
Social Influence	6.536	6.953	13.49	4	0.417	1
Facilitating Conditions	6.815	6.815	13.63	3	0	4
Attitude of Use	6.702	6.976	13.679	2	0.274	2

The following figure shows the model of significant relations, diagrammatically representing the values of (D+R) which are placed on the horizontal axis and the values of (D-R) on the vertical axis. The position and interaction of each factor with a point in the coordinates (D+ R, D-R) are determined by coordinate system.

Figure 2: Cause-effect diagram

3.3.3 Interpreting the results

According to the diagram and table above, each factor can be assessed based on the following aspects:

- Horizontal vector ($D + R$) represents the degree of importance between each factor plays in the entire system. In other words, ($D + R$) indicates both factor i's impact on the whole system and other system factors' impact on the factor. In terms of the degree of importance, Performance Expectancy is in the first place, and Attitude of Use, Facilitating Conditions, Social Influence, and Effort Expectancy are ranked in the next places.

- The vertical vector ($D-R$) represents the degree of a factor's influence on system. In general, the positive value of $D-R$ represents a causal variable, and the negative value of $D-R$ represents an effect. In terms of the degree of importance, Social Influence is in the first place, and Attitude of Use, Performance Expectancy, Facilitating Conditions and Effort Expectancy are ranked in the next places.

Therefore, from Table 6: The Final Output and Figure 2; Cause-Effect diagram, generally, Performance Expectancy, Social Influence, Attitude of Use are considered to be causal variables, while Effort Expectancy is regarded as an effect and Facilitating Conditions is neither having a causal effect nor is it receiving influence from other criteria. In explaining the coordinate positions of ($D + R$) and ($D - R$), given their degrees and directions of interactive influence,

- A large ($D+R$) and a positive ($D-R$), is comprised of PE (D_2) - ranked 1 and 3 and AU (D_5) -ranked 2 and 2 implying that these criteria are causes and driving factors for solving problems. Also, they are deemed as core criteria which influence other criteria since they are relatively prominent and have high relations;
- A small ($D+R$) and a positive ($D-R$), is comprised of SI (D_3) ranked 4 and 1 and FC (D_4) ranked 3 and 4 indicating that SI and FC are independent. However, SI influences a minority of the other criteria due to its low prominence, and as a result, using MS Excel version 10 the degree of influence is low though having high relation. Alternatively, FC is influenced by other criteria and the degree of influence is extremely low;
- There is no representation of a large ($D+R$) and negative ($D-R$), implying that there are no effect-type attributes which are the core problems to be solved;
- A small ($D+R$) and negative ($D-R$), is comprised of EE (D_1) -ranked 5 and 5 that shows EE as independent. However, EE can be influenced by only a few other attributes while its degree of influence is extremely low.

In summary of the aforementioned analyses of the directions and degrees of influence, this study revealed that PE and AU are the core determinants which influence other factors and that they are the driving factors for problem solving. The PE criterion is more significant in its direct influence on users of the eLAA system as indicated by the highest positive value of " $D + R$ ". Alternatively, the EE criterion overall has the least power of direct influence to other criteria.

4. Descriptive Analysis of Results

4.1 Data demographics analysis

Legal Aid SA was used in this case study which covers 1223 respondents located in six regions and one national office. Our UTAUT survey instrument contains demographic information (Table 7) which includes, Occupational Group, Length of Work, Gender, Regional Office and Size of Local Office as moderating factors of UTAUT.

Table 7: Demographic Analysis

Characteristics	Frequency	Percentage
Occupational Group		
Legal -Criminal/National Operations	683	56%
Legal – Civil/Legal Development	234	19%
Administration/Board Secretary/Executive PAs	256	21%
Finance / Internal Audit	27	2%
HR/Communications	15	1%
Information Technology	8	1%
Length of Work		
>1yr	80	7%
<1yr>3yrs	168	14%
≤3yrs>5yrs	68	6%
5yrs>10yrs	289	24%
≤10yrs	618	51%
Gender		
Female	682	56%
Male	526	43%

Other	15	1%
Regional Offices		
Limpopo/Mpumalanga	141	12%
Gauteng	207	17%
KwaZulu-Natal	214	17%
Eastern Cape	256	21%
Western Cape / Northern Cape	210	17%
National Office	37	3%
Size of Local Office		
Small	249	20%
Medium	604	49%
Large	370	30%

The respondents are dominantly of the Legal -Criminal/National Operations (56%) occupational group, followed by the Administration/Board Secretary/Executive PA's group (21%), and closely by Legal – Civil/Legal Development (19%) group. The small number of users are from the Finance / Int. Audit (2%), HR/Comms (1%) and Information Technology (1%). Notably, half of the users of the eLAA system have a significant length of work which is equal to or more than 10yrs in service (51%). The remaining half of users are 5yrs>10yrs (24%), ≤3yrs>5yrs (6%), <1yr>3yrs (14%) and >1yr (7%). Gender split is skewed to females (56%) against males (43%) and other (1%). The responses of users were fairly spread in Limpopo/ Mpumalanga (12%), Gauteng (13%), FreeState/NorthWest (17%), KwaZulu-Natal (17%), Eastern Cape (21%), Western Cape/ Northern Cape (17%), and National Office 3%). The user responses are differentiated as from small (20%), medium (49%) and large (30%) local offices. Overall, the mixture of respondents provides a good picture of the organizational profile of Legal Aid SA.

4.2 Descriptive Statistics of UTAUT Factors (EE, PE, SI and FC)

The research questions for this study were purposely aligned with the factors of the UTAUT construct.

The response to the questionnaire by users indicates the average perceptions of employees as EE (68%), PE (63%), FC (58%) , and low SI (55%). However, the significant responses were observed in the following areas:

Effort Expectancy: 84% of employees could use the eLAA system because they were eager to use it, and 81% of employees' belief that they can use the eLAA system because of their experience with using the Ad-Infinity System for the same type of tasks. However, only 46% of employees could use the eLAA system though no one showed them how to use it. The mean values have indicators fluctuating between 3 and 4, possibly as a signal of mixed feelings and ambiguous perceptions of their effort expectancy.

Performance Expectancy: 82% of employees agree that the eLAA system is useful for their work performance. In contrast, only 33% of employees agree that using the eLAA system will increase their opportunity for promotion. The mean value is above 3 and towards 4, implying that users of the eLAA system seem to be more confident in agreeing with the questions.

Social Influence: 78% of employees could use the eLAA system since Legal Aid SA was supportive. Alternatively, 28% of employees could use the eLAA system because they were influenced by others. Along the same line, the mean for the 78% of the employees shows a moderate Agree value of 4 while in general, all responses are lower than 4 and above 2. That suggests that respondents are uncertain whether they agree or not concerning the effect of social influence on using the eLAA system.

Facilitating Conditions: 80% of employees could use the eLAA system during official business hours, and 43% of employees could use the eLAA system only after the online training manual was available. The mean values of Facilitating Conditions are generally between 3 and 4, implying that employees somehow Neither Agree or Disagree and moderately Agree.

Overall, the responses provide a relatively fair spread of respondents across Legal Aid SA's offices and comprises sufficient representation by all occupational groups. The standard coefficient values of all UTAUT factors tested provides data values ranging from a low zero value that implies similar data values for a particular variable to highly variable values. Appendix A provides details of the responses to the questionnaire by users of the eLAA system.

Findings on UTAUT Factors and Fuzzy Dematel

Venkatesh et al. (2003) suggested that all the four factors (EE, PE, SI, FC) of the UTAUT Model directly influence the behavioral intention which then impacts the Attitude of Use. This study agrees with Venkatesh et al. (2003). We indicate

that from the four main UTAUT variables, the EE criterion in overall has the least power of direct influence to other criteria. PE criterion is more significant in its direct influence on users of the eLAA system. Both *SI* and *FC* criteria have a low direct influence on other criteria, including the AU.

5. Conclusions

This study attempted to measure user perception using the new electronic Legal Aid Administration (eLAA) system of Legal Aid SA. We analyzed the collected data from a sample of 1223 (50.4%) users across the organization by using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The perception measured by users' response is useful information on users' attitude of accepting the eLAA system. Additionally, using the Fuzzy Decision-Making Trial and Evaluation Laboratory (Dematel) method clarified the composite relationship of UTAUT factors by explaining the degree of importance of each UTAUT factor to predict collective user behavior and eventual actual system use of the eLAA system. The findings of this study provide the research findings with the following conclusions:

1. The results of this study are consistent with Venkatesh et al. (20003)'s findings. In this study that involves using the eLAA system.
2. Management of Legal Aid SA and other organizations should pay more attention to expectancy of users of their technology systems which are causal factors to effectively manage the employees' (users)' attitude of use of new technology. Users of the eLAA system considered it as useful for their work performance and managers should capitalise on user confidence of the eLAA system to manage other determining factors of actual use of the eLAA system.
3. Management should monitor Social Influence within the workplace to contain its potential negative effect on using the eLAA system.
4. Managers should be conscious of the fact that they have leverage of mandatory directive to employees to use the eLAA system and in this study the attitude of use of the eLAA system by users is deemed as a perceptual reaction to using it.
5. All users of the eLAA system should be made aware of the potential causes of their perception of acceptance of new Information technology system. Besides, relevant organizational programs by management would create a favourable working environment, including Social Influence and Facilitating Conditions, to promote perceptions of acceptance of any future new technology within Legal Aid SA while improving the attitude of use by users of the information Technology system.
6. Management of organizations such as Legal Aid SA are expected to derive usefulness of this study for information technology acceptance in a work environment.
7. Decision-makers in organizations should address perception factors of acceptance of users of new systems to realize the anticipated gain in workforce productivity. Importantly, the success or failure of implementation of any new Information Technology system requires user participation during the development of such a system, including for the design or modification thereof.

Acknowledgements

Legal Aid SA has provided the access and platform of this research study by allowing their employees to participate in the survey instrument. The statements made herein are solely the responsibility of the authors.

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Appendix A: The responses to the questionnaire by users of the eLAA system.

Effort Expectancy			
Descriptive Statistics	Mean	Std Deviation	N
Question 1: Effort Expectancy (EE) [1.1. I could use the eLAA system because I have used the Ad-Infinium system before in performing the same tasks. The response shows that 81% of employees' belief that they can use the eLAA system because of their experience with using the Ad-Infinium System for the same type of tasks.	4,1	0,71	1223
Question 2: Effort Expectancy (EE) [1.2. I could use the eLAA system because I have seen someone using the eLAA system before I tried it myself. The response shows that 60% of employees' belief that they could use the eLAA system because they have observed others using the system before they tried using it.	3,5	2,12	1223
Question 3: Effort Expectancy (EE) [1.3. I could use the eLAA system because I was eager / wanted to learn by myself how to go about using it. The response shows that 84% of employees could use the eLAA system because they were eager to use it.	4,2	0,00	1223
Question 4: Effort Expectancy (EE) [1.4. I could use the eLAA system even though no one showed me how to go about using it. The response shows that 46% of employees could use the eLAA system though no one showed them how to use it.	3,2	2,12	1223
Performance Expectancy			
Descriptive Statistics	Mean	Std Deviation	N
Question 1: Using the eLAA system, Is useful to my work performance/activities. The response shows that 82% of employees agrees that the eLAA system is useful for their work performance.	4,1	0,71	1223
Question 2: Using the eLAA system, Improves/increases my productivity. The response shows that 69% of employees agrees that in using the eLAA system they are able to be more productive.	3,8	2,12	1223
Question 3: Using the eLAA system increase my chances of meeting my annual performance targets. The response shows that 69% of employees agrees that by using the eLAA system they are able to meet their annual performance targets.	3,8	2,12	1223
Question 4: Using the eLAA system will increase my chances of getting a promotion. The response shows that 33% of employees agree that using the eLAA system will increase their opportunity for a promotion.	3,0	0,71	1223
Question 5: Using the eLAA system enables me to accomplish tasks more quickly. The response shows that 64% of employees agrees that by using the eLAA system they are able to work more quickly.	3,7	0,00	1223
Social Influence			
Descriptive Statistics	Mean	Std Deviation	N
Question 1: I could use the eLAA system only after someone has shown me how to go about using it. The response shows that 53% of employees could use the eLAA system only after being shown by someone how to use it.	3,3	0,71	1223
Question 2: I could use the eLAA system only after I learned from someone who have used it. The response shows that 53% of employees could use the eLAA system only after learning from someone.	3,3	1,41	1223
Question 3: I could use the eLAA system because my manager has been helpful in using the eLAA system. The response shows that 60% of employees could use the eLAA system having being helped by their managers.	3,5	2,12	1223
Question 4: I could use the eLAA system because people who influence my behavior think I should use it. The response shows that 28% of employees could use the eLAA system because they were influenced by others	2,7	0,00	1223
Question 5: I could use the eLAA system because in general Legal Aid SA has been supportive in using the eLAA system. The response shows that 78% of employees could use the eLAA system since Legal Aid SA was supportive.	4,0	1,41	1223
Facilitating Conditions			
Descriptive Statistics	Mean	Std Deviation	N
Question 1: I could use the eLAA system even though there is no built-in help facilities. The response shows that 48% of employees could use the eLAA system even though built-in help facilities were not provided.	3,3	0,71	1223
Question 2: I could use the eLAA system only after the online training manuals were made available for reference. The response shows that 43% of employees could use the eLAA system with the available online training manual.	3,2	0,71	1223
Question 3: I could use the eLAA system because I have the resources necessary to use the eLAA system. The response shows that 74% of employees could use the eLAA system since they have the necessary resources.	3,9	2,12	1223
Question 4: I could use the eLAA system even though I may have not used Ad-Infinium system before. The response shows that 47% of employees could use the eLAA system even though they never used the Ad-Infinium system before.	3,2	0,71	1223
Question 5: I could use the eLAA system during official business hours. The response shows that 80% of employees could use the eLAA system during official business hours.	3,9	1,41	1223

Appendix B: Expert Profiles

Job title	Job Description	Gender	Age Group	Relevant Professional Qualification	Work Experience
eLAA Project Manager	Manages the development of the eLAA Project	Male	30yrs – 39yrs	BSc Computer Science, Honours in Computer Science, Master in Business Leadership.	About 13-year experience in the IT industry with a strong background in IT infrastructure.
Head of Local Office	Each head is the overall manager of a local office and ensures effective delivery of the legal aid system and services.	Male	40yrs – 49yrs	LLB degree	Over 20 years of work experience in the legal field
Head of Local Office		Female	≥50	BJuris and LLB degree	Over 20yrs senior management level experience.
Head of Local Office		Female	≥50	LLB	Twenty-four years senior management level experience.
Head of Local Office		Male	≥50	BA(LAW); LLB; PG Diploma in Forensic Auditing; Diploma in Computers; CPLD; Project Management	Over 25 years in various departments of the organization at the local level.
Head of Local Office		Male	40yrs – 49yrs	Bachelor of Laws	Twelve years senior management level experience.
Financial Manager	Financial Management	Male	40yrs – 49yrs	BCompt	About 5yrs Financial Management experience
Legal Practitioner	Legal Practitioner	Female	≥50	LLB degree	Finance, Legal Admin, HR and General Office Administration.
Computer Audit Manager	Assure Information Technology Systems controls	Male	≥50	High Diploma in Computer Auditing	22yrs working experience as IT Auditor
Business Application Software Manager	Manage organizations Software Development Life Cycle	Male	40yrs – 49yrs	BTech (Information Technology), BTech (Project Management)	Development, Databases, BI, Project Management, Management
Legal Manager	Manage the delivery of civil legal services	Female	40yrs – 49yrs	BProc, LL.B degree, and Certificate: Leadership Development	Over 13 years' experience as a legal practitioner in criminal and civil litigation and 14 years of managerial experience
IS Security Assurance Officer	Provide assurance on Information Technology Security for the organization	Male	30yrs – 39yrs	BSc Degree	Ensuring cyber security from user to firewall level
Syspro Project Manager	Responsible for the Syspro Integration to eLAA	Female	≥50	BCom (Accounting)	Over 17yrs of experience in the Finance Industry

Appendix C Professional Biography

Dr. Jeremiah Makokoane's research interests are in the areas of organizational productivity, leadership and organizational development with particular focus on the South African public sector institutions. He holds a Doctorate degree in Applied Management from Monarch Business School in Switzerland, a Master's degree in Business

Administration (MBA) from the Management College of Southern Africa, and a Bachelor's degree in Commerce from the University of South Africa (UNISA). Dr. Makokoane has over 20-years' experience as a public servant. He is currently a member of The Southern Africa Institute of Management Scientists and writes as an independent researcher.

Docter Joe Khosa's research interests are in the areas of Artificial Intelligence (AI) and Machine Learning (ML). His focal point is on AI and Law. He holds Masters in Business Leadership (MBL) degree from University of South Africa (UNISA), a higher diploma in Computer Science from university of Witwatersrand (Wits) and a BSc in Computer Science from University of Limpopo (UL). Docter Joe Khosa has over 13 years' experience in the Information Technology environment. He is currently pursuing his PhD degree with University of Johannesburg, South Africa under the Faculty of Engineering and the Built Environment.