User Preference Analysis of Internet Social Media Services

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Abstract

The size, scope and significance of Internet Social Media (ISM) services have grown exponentially in recent years. This paper discusses the context, methodology, findings, and conclusions from an exploratory study that assessed users' preferences of ISM services. The study uses a mixed methods approach to explain why ISM services are liked or disliked by users. This is an important area for research since users are the most important stakeholders of any ISM service. The outcomes of this exploratory study were sets of rankings of ISM services that were based entirely on users' preferences. This has not been studied in prior research up to this point. As Internet social networks continue to grow in their popularity and usefulness, this study provides a better understanding of the preferences of ISM users that is valuable to both academia and practitioners. The ISM services that are compared in this study include Facebook, MySpace, Google Plus, LinkedIn, Twitter, YouTube, Groupon, Digg, Yelp, and Loopt.

Keywords

Social Media, Social Network, Preference Analysis, Hierarchy, AHP, Electre III.

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1. Introduction

Internet Social Media (ISM) services, also known as social networks, have become one of the fastest growing categories of Internet applications. A study by ClickZ.com (2010), a marketing advisory firm, found that "social networking now accounts for almost a quarter of U.K. users' time online, at 22.7 percent, followed by e-mail which accounts for 7.2 percent of their online activity, and gaming at 6.9 percent". In terms of a registered user base, Facebook is the flagship ISM service with 700 million users. Myspace (130 million users), Orkut (100 million users), Twitter (75 million users) and LinkedIn (70 million users) are the other popular ISM services. Friedrich et al (2011) argue that the popularity and performance of social collaboration technologies (such as social networks) have resulted in the "rapid creation of fast-moving political and business pressures." Despite the surge in popularity of ISM services there is a major lack of published research about users' preferences of ISM websites such as Facebook and Twitter.

2. Overview of Internet Social Media Services

ISM services have become valuable brands by providing features that allow users from around the world to associate, relate, communicate and interact. The success of ISM services has also resulted in the development of mashup services that combine the features and functions of different ISM services so that users can benefit from the capabilities that such integration permits (e.g. BuddyBlend and Jamzee). The development of a large number of mashup services highlights the ecosystems of related applications that ISM services have created. Similar to mashups are the social applications that are being developed for ISM services. Facebook, MySpace and other ISM services provide application programming interfaces for developers to make applications, such as games or social productivity tools that run on their platforms. These applications can be developed by third parties who monetize them in a variety of ways (e.g. Zynga and Chillingo). The adoption of social applications by users of ISM services also showcases the network of partners that are built around ISM services. As users of ISM services, businesses have also reaped many benefits from them. Businesses use ISM services to perform many activities which include: communicate with their customers, understand consumer behaviours, collaborate with their partners, associate with the public, and market their merchandise (Edelman and Salsberg, 2010). However, a lack of understanding of the preferences of ISM users about these services has resulted in businesses not knowing whether they are earning appropriate returns on their social media investments. According to Anderson et al (2011), "The short history of the Internet can be summed up in a few words: Attracting a crowd is relatively easy. Monetizing that crowd? Not so much." This statement is appropriate for ISM services as well.

3. Methodology

3.1. Approach

ISM services can be compared in various ways, such as in terms of their technical characteristics (e.g., age and size of ISM services) and the subjective assessments of their users (e.g., utility and

sense of privacy). Our research investigated various aspects of ISM services in the context of their users' preferences. The goal of our research was to understand how users regard the relative importance of various features of ISM services and how they score and rank the various ISM services in the context of those features. Measurement of preferences was done in two ways in our study in order to minimize any method-specific biases. This combination of quantitative and qualitative analysis was aimed to help us understand how the respondents preferred ISM services and also "Why." This exploratory research received 35 usable responses to the survey.

3.2 Interpretive Lens: Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) postulates that user acceptance is determined by the perceived usefulness and the perceived ease of use of a technology (Davis et al., 1989; Venkatesh and Morris, 2000). TAM argues that humans engage with that technology which they perceive as being helpful to them for achieving their goals and which they perceive as being one that they can utilize. This means that perceived usability and perceived utility are relevant when trying to understand user preferences about technology.

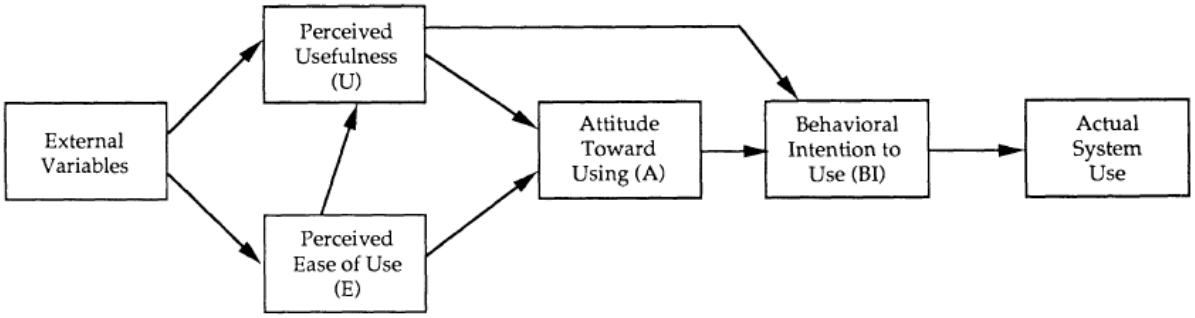

Figure 1: Technology Acceptance Model (Source: Davis, Bagozzi and Warshaw, 1989)

Bagozzi (2007) states that, "By any measure, TAM qualifies as a remarkable accomplishment, even reaching the status of a paradigm of sorts." The popularity of TAM is in part due to its simplicity. It only comprises two factors which supposedly explain all technology acceptance behaviors. However, its simplicity has also been used to question its applicability. Thus, Bagozzi (2007) contends that, "It is unreasonable to expect that one model, and one so simple, would explain decisions and behavior fully across a wide range of technologies, adoption situations, and differences in decision making and decision makers." TAM has been revised and extended by various researchers (e.g. Venkatesh and Davis, 2000; Gefen and Straub, 1997). The revision and extensions allow TAM to be applied over a wider range of technologies and in relation to broader user groups. The variables in TAM comprise the basic criteria along which users can compare ISM services. The use of TAM provides a balance between analytic detail and survey complexity. Prior to this study, TAM has been applied to many technology acceptance scenarios and has demonstrated its versatility. Despite the criticisms of TAM, it remains a highly pertinent theory for use in this study. Its variables of Usefulness and Ease of Use provide bases of comparison through which users of ISM services can describe their preferences. In this study TAM variables will be used to research user adoption of social networking sites in order to measure user preferences of social networking sites.

3.2. Tools: Analytic Hierarchy Process and Electre III

Analytic Hierarchy Process (AHP) is an extensively used multi-criteria decision-making method (MCDM), (Sen et al, 2010). MCDMs such as AHP are useful for comparing alternatives via multiple quantitative and qualitative as well as objective and subjective judgments. AHP provides the user with a preference hierarchy that can be applied consistently over many alternatives and this leads to decision paths that can be recorded and justified. AHP decomposes a complex problem into a multi-level hierarchical structure of objectives, criteria, sub-criteria and alternatives (Sarode et al 2010). Objectives describe the type of solution that is required (eg., determine favorite ISM service), criteria and sub-criteria (e.g., usefulness, ease of use) are used as the bases for differentiating across the candidates and the alternatives are the choices (eg., various ISM services that are a part of the decision making process) that are being considered for the solution. By using a hierarchical approach the user is able to follow a systematic methodology for solving the problem.

ELECTRE III is a non-compensatory, MCDM technique that uses various mathematical functions to indicate the degree of dominance of one alternative or group of alternatives over the remaining ones (Tam et al, 2003).” It requires the user to rank the criteria for a decision problem and then rank the alternatives within each criterion. It is considered non-compensatory because exceptional scores in a minority of criteria do not compensate for their opposite scores in the majority of criteria. This means that an alternative in Electre III does not make up for its low ranks in a majority of criteria with a high rank in one of them. It helps compare alternatives by ascribing initial weights to decision criteria, and then varying these weights as part of a sensitivity analysis, if their exact weights are not known (Rogers, 2000).

4. Findings

4.1 Criteria Preference

Our study used the criteria ease of use and usefulness as derived from the Technology Acceptance Model (TAM). In order to rank the alternatives (ISM services) using these criteria it was necessary to determine the weights of these criteria. A survey asked the respondents to specify whether they like ease of use more than usefulness or vice versa. They were also asked to specify the magnitude by which they preferred that criteria over the other. This information was used by AHP and Electre III for weighing the scores they assigned to the alternatives since both of these processes use weighted scores. The average weights of the TAM criteria, based on the responses to the survey, were 56% for usefulness and 44% for ease of use.

The average weight of the ease of use criteria by those who favored it was 80% while the average weight of the usefulness criteria by those who favored it was 75%. Stated differently, this means that respondents who preferred ease of use, on an average, liked it more strongly than those respondents who preferred usefulness liked that criterion. However, since the respondents who favoured usefulness outnumbered those who preferred ease of use by 2 to 1 their relatively weaker average preference for usefulness (75%) outweighed the relatively stronger average preference for ease of use (80%) by those who prefer that criteria.

The major characteristics of ISM services, pertaining to usefulness, that endear them to users were communication, association, entertainment and productivity. The minor characteristics

(included in the theme titled "Other") were Access to information (6% of responses) and Learning (3% of responses). This information was based on the responses to the survey question '*What aspect of usefulness do you like the most about ISM services in general (e.g., productivity, updates, entertainment, communication, association)?*' These findings suggest that users primarily consider ISM services as a communication channel. However, since they also use it for the purposes of association (i.e., connecting with people), entertainment and productivity it means that ISM services are the locus of virtual communities. Not only can they be used for maintaining contact with people and communicating with them but they can also be used for social gaming and professional collaboration all via one platform.

Theme	Percentage of respondents
Communication	70%
Association	30%
Entertainment	30%
Productivity	20%
Other	16.7%

Table 1: Major themes corresponding to the preferred usefulness characteristics of ISM services

The major characteristics of ISM services, with respect to the ease of use, that make users prefer them were simplicity, real-time, consistency and multichannel. The minor characteristics included Ubiquity (6% of responses) and Cleanliness (3% of responses) — which is freedom from clutter. This information was based on the responses to the survey question '*What aspects of ease of use do you like the most about ISM services in general (eg., ubiquity, multichannel, realtime, consistency, simplicity)?*' One respondent answered this question by stating, "*Hands down SIMPLICITY. The less complicated/confusing the better.*" Another respondent stated, "*I like the realtime aspects of twitter - showing what is being talked about most at every second (trending topics based on region). I value simplicity in social media, thoughts mean more than pictures which is why I like twitter more than facebook which has too much going on at all times.*" These finding suggests that far and away the most desirable trait of an ISM service, with respect to ease of use, is its simplicity. Users expect to be able to navigate and operate the ISM service in a user friendly manner. They also like being able to access content as soon as it is published and connect with people as soon as they come online.

Theme	Percentage of respondents
Simplicity	76.7%
Real-time	33.3%
Consistency	13.3%
Multichannel	13.3%
Other	20%

Table 2: Major themes corresponding to the preferred ease of use characteristics of ISM services

The major reasons that respondents provided for their disliking an ISM service were privacy concerns, SPAM, unproductive and addictive aspects of the service. This information was based on responses to the survey question '*What aspects of ISM services do you dislike (eg., friend collectors, unproductive, spam, privacy concerns, addictive)?*' One respondent answered this question by stating, "*I do not like being overloaded with too much information. There should be filters to see only what you want to see. Privacy seems to be a strong issue with social media, and I prefer to have the ability to adjust my privacy features.*" Another stated, "*In sum, it sometimes seems too much. When involved in 5, 6, 7 ISM services, it gets very all consuming and hard to keep track of and current with, therefore hurting overall productiveness. Privacy also a concern for sure.*"

Selling of private information and use of personal information for commercial purposes by the ISM service without the consent of the user was specified as the biggest complaint against these services. Unsolicited communications and annoying intrusions into the communication stream by unknown persons via mass mailings and bulk correspondence on ISM services were identified as another reason that people dislike certain participants on ISM services. Allowing this type of behaviour reflects poorly on the ISM service and many services already have mechanisms in place to deter this from happening. Respondents also mentioned the predominant use of social media for personal and entertainment purposes as leading to lack of productivity. Moreover, the engaging nature of many ISM services and their rich capabilities made some respondents refer to their addictive characteristics. These findings provide a context for recognizing the reasons for user preferences of ISM services. On this basis it can be assumed that ISM services that were highly preferred consist of the more desirable characteristics in greater weight than the undesirable attributes.

Theme	Percentage of respondents
Privacy	56.7%
SPAM	36.7%
Unproductive	26.7%
Addictive	23.3%
Other	30%

Table 3: Major themes corresponding to the user disliked characteristics of ISM services

4.2 Findings with Analytic Hierarchy Process

AHP used pair-wise judgements of each of the alternatives (ISM services) along each of the TAM criteria and the comparisons of those criteria for developing an overall score of each alternative. The scores represent preference with higher scores referring to greater preference. Based on AHP, YouTube emerged as the most preferred ISM overall amongst the respondents. It had the highest rank for both of the criteria and thus had the highest score on the whole. FaceBook, Twitter and LinkedIn ranked second, third and fourth respectively in both of the criteria and thus these were also their respective overall ranks. From the fifth overall rank onwards the social media services had different ranks for ease of use and usefulness. With respect to ease of use, Yelp, Groupon, Google Plus, Digg, MySpace and Loopt occupied ranks five through ten respectively. However, in terms of usefulness, the ranking was Google Plus,

Groupon, Yelp, Loopt, Digg and MySpace. The overall ranking of ISM from ranks five through ten was Yelp, Google Plus, Groupon, Digg, Loopt and MySpace respectively.

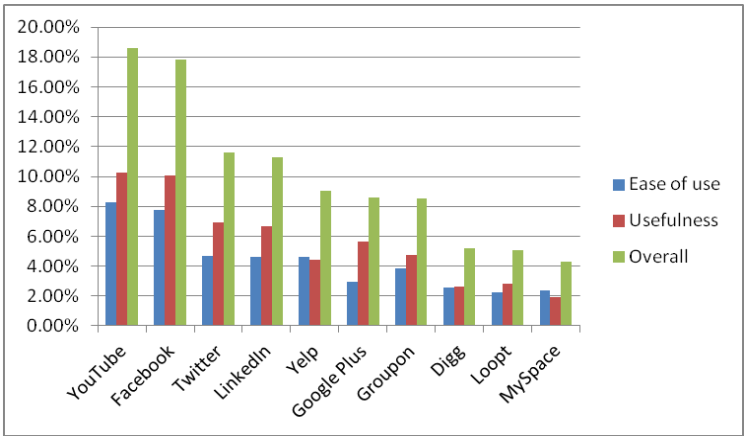

Figure 2: Weighted average scores of social media services based on AHP

Social Media	Ease of use	Rank	Usefulness	Rank	Overall	Standing
YouTube	8.29%	1	10.28%	1	18.57%	1
Facebook	7.75%	2	10.07%	2	17.82%	2
Twitter	4.70%	3	6.90%	3	11.60%	3
LinkedIn	4.64%	4	6.67%	4	11.31%	4
Yelp	4.60%	5	4.41%	7	9.01%	5
Google Plus	2.96%	7	5.65%	5	8.61%	6
Groupon	3.84%	6	4.71%	6	8.56%	7
Digg	2.59%	8	2.60%	9	5.19%	8
Loopt	2.24%	10	2.80%	8	5.04%	9
MySpace	2.38%	9	1.91%	10	4.28%	10
Total	44%		56%		100%	

Table 4: Ranks and standing of social media services based on AHP

4.3 Findings with Electre III

Electre III uses scores assigned to each alternative (ISM service) along each criterion (TAM) and the significance of each criterion to the decision to develop a score for each alternative. The score represents preference and a higher score means more preference. Based on Electre III, YouTube emerged as the most preferred social media service overall amongst the respondents. It had the highest score in both of the criteria and thus had the highest total score. FaceBook, LinkedIn, Twitter and Google Plus were ranked second, third, fourth and fifth overall respectively. FaceBook had the second highest rank in ease of use and usefulness however the positions of Twitter and LinkedIn were inverted with respect to ease of use and usefulness. Twitter was ranked third in ease of use and fourth in usefulness whereas LinkedIn was ranked

third in usefulness and fourth in ease of use. Google Plus was ranked fifth in usefulness but seventh in ease of use.

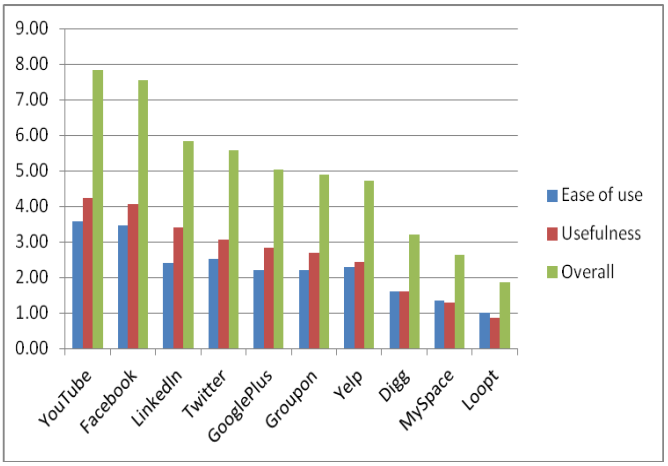

Figure 3: Weighted average scores of social media services based on Electre III

Groupon, Yelp, Digg, MySpace and Loopt occupied ranks sixth to tenth respectively both overall and in terms of usefulness. However, with regards to ease of use, the rankings from sixth to tenth were Groupon, Google Plus, Digg, MySpace and Loopt respectively.

Social Media	Ease of use	Rank	Usefulness	Rank	Overall	Standing
YouTube	3.58	1	4.25	1	7.83	1
Facebook	3.46	2	4.07	2	7.54	2
LinkedIn	2.42	4	3.42	3	5.83	3
Twitter	2.51	3	3.07	4	5.58	4
GooglePlus	2.19	7	2.83	5	5.02	5
Groupon	2.22	6	2.69	6	4.91	6
Yelp	2.29	5	2.42	7	4.72	7
Digg	1.60	8	1.61	8	3.21	8
MySpace	1.36	9	1.28	9	2.64	9
Loopt	1.01	10	0.85	10	1.86	10

Table 5: Ranks and standings of social media services based on Electre III

5. Conclusion

The central topic with which our research was concerned was the measurement of user preferences regarding ISM services. To that end it successfully made use of Analytic Hierarchy Process and Electre III to understand user preferences regarding ISM services. These tools uncovered information regarding what users like and dislike about ISM services. Our analysis of the product of these tools was contextualized by the answers in the qualitative section of our survey. It must be noted that although Analytic Hierarchy Process and Electre III both measure

preference they operate on different types of data. Analytic Hierarchy Process uses judgments regarding comparisons between each pairs of alternatives with regards to each of the criteria while Electre III uses scores assigned to each of the alternative also pertaining to each of the criteria. Since comparative judgments can be calculated and stated quite differently from individual scores it can be expected that both of these tools might yield different ranks of ISM services. However, what our study discovered (see Table 6) is that both of these tools yielded fairly similar rankings of ISM services.

Social Media	AHP Score	AHP Standing	Electre III Score	Electre III Standing
YouTube	18.57%	1	7.83	1
Facebook	17.82%	2	7.54	2
Twitter	11.60%	3	5.58	4
LinkedIn	11.31%	4	5.83	3
Yelp	9.01%	5	4.72	7
Google Plus	8.61%	6	5.02	5
Groupon	8.56%	7	4.91	6
Digg	5.19%	8	3.21	8
Loopt	5.04%	9	1.86	10
MySpace	4.28%	10	2.64	9
Total	100%		NA	

Table 6: Ranks and standings of social media services based on AHP and Electre III

YouTube scored the highest on both datasets (for AHP and Electre III) and for both TAM criteria. Thus it occupied the top standing overall in the results of both preference measurement tools. Similarly, FaceBook came second overall in both AHP and Electre III analysis as it had the second highest scores in both of the TAM criteria on both of the datasets. Even though both of these tools used different data sets with different types of data and processed them in different ways the gap between the first two ISM services was 0.75% and 3.7% using AHP and Electre III respectively. This is a small difference and suggests that users of ISM services prefer YouTube over FaceBook but only slightly.

The differences in the ranks between AHP and Electre III can be accounted for by the differences in the data they process and the way in which they process data. First of all, they operate on different types of data— pairwise comparisons of all the alternatives along each of the criteria in the case of AHP and individual scores for all of the alternatives along each of the criteria in the case of Electre III. It is possible for respondents to provide inconsistent judgments across these two types of data and thus lead to disparate ranks using these tools. Also, there may be a disparity in the general order of scores for the alternatives. Such inconsistent judgments can result in different rankings using these tools. Secondly, these tools calculate the ranks of the alternatives using different approaches— AHP calculates priority vectors for each alternative for every criterion by comparing it with all the other alternatives for that criterion and combines that

information with the criteria weights to arrive at the overall ranking. Electre III takes the individual scores of each of the alternatives and factors in the criteria weights to determine the weighted scores of each of the alternatives and sums the weighted scores for each of the alternatives to calculate the overall ranking. These differences in processing approaches can also amplify or attenuate (depending on the data sets) the differences in the underlying data and thus result in different rankings.

The first benefit of using multiple tools for measuring user preferences is that calculation of multiple sets of rankings increases the confidence of the convergent observations. The second benefit of using different tools is that divergent observations can be used to detect underlying patters in the judgments supplied by the respondents. For example, preference ranks for the alternatives ranked 3 to 10 using AHP and Electre III were determined to be in bands rather than individuals. There was a clear dominance of certain bands over others however within the bands the rankings were different depending on whether AHP was used or Electre III. These bands are discussed in more detail at the end of this section. The ability to increase the validity of the convergent observations and infer patterns and relationships from divergent observations justifies the use of different tools in this research.

The respondents cited simplicity (76.7%) and communication (70%) as the most important aspects of ISM services. YouTube, with its easy to use interface and powerful search engine, is straightforward and clear in its presentation. FaceBook also has a crisp and methodical layout that allows users to organize content in various sections of the interface and tailor the content that is presented to them. These are both mature ISM services whose user interface has been refined over many years. They seek feedback from users in terms of suggestions for making the user interface better and their easy to use interfaces netted them high marks from the respondents. With respect to communication, FaceBook provides many ways for its users to communicate with their FaceBook contacts. This includes, but is not limited to, wall posts, messages, tags, chats and pokes to name a few methods. Its communication capabilities are regularly upgraded and users are notified of new or improved methods.

The respondents cited privacy concerns (56.7%) and SPAM (36.7%) as the leading reasons for their disliking certain ISM services. In the context of privacy concerns there are two related factors that texture a user's opinion about an ISM service. The first is the privacy policy of the ISM service and the second is the user's perception of the behavior of the ISM service with respect to privacy topics. Even though FaceBook is often approached suspiciously by privacy watchdogs it engages in stakeholder outreach and diffuses some of the criticism for its potential to use private information for commercial gain. By being in the public spotlight with regards to this issue, FaceBook is able to allay some of the concerns of its critics on matters of privacy (Fellow, 2009; Perez, 2010; Bankston, 2010; Vogelstein, 2010). YouTube, which allows users to watch videos and listen to audio without signing-on is not generally considered a bad actor with respect to protecting the sensitive information of its users. In general, ISM services maintain a trove of personal data about their users and thus are approached skeptically on the topic of privacy. Since other ISM services do not appear to engage in as much public outreach as FaceBook regarding the topic of privacy they seem to suffer from the default apprehension of suspicion that users assign to them. In relation to SPAM, YouTube content is available to users without signing-on and thus unsolicited communications can be as limited as content

recommendations and advertisements. FaceBook, which provides a comprehensive communication platform, has developed a sophisticated junk filtering system that is on par with advanced email servers.

Twitter scored the third highest overall score using AHP but scored fourth highest overall score using Electre III however, LinkedIn scored fourth highest overall score using AHP and third highest overall score using overall Electre III. The differences in the overall scores of LinkedIn and Twitter were close to 2.5% using AHP and 4.2% using Electre III. The difference between the overall scores of FaceBook and the third ranked ISM services on both of these tools were 34.9% for AHP and 25.9% for Electre III. This shows a clear difference in the overall preference for the group of ISM services containing the third and fourth ranked services which are LinkedIn and Twitter from the group of ISM services containing the leading ISM services which are YouTube and FaceBook. From the third rank onwards the bands of two (Twitter, LinkedIn) and three (Yelp, GooglePlus, Groupon and Digg, Loopt, MySpace) ISM services suggest that users do not overwhelmingly favour any particular ISM service within a band. However, they like the ISM services in the band with the low ranks over the ISM services in the band with high ranks.

These bands suggest that ISM users are precise in stating their preferences of groups of ISM services however they are imprecise in stating their preferences of ISM services within the same group. The exception to this are YouTube and FaceBook where the users decisively ranked these ISM services as first and second respectively on all criteria. This can be attributed to their high intensity of preference for the most liked services over those ISM services that are not as appealing. A high intensity of liking would lead to a clear and consistent statement of preference whereas a lower intensity of liking would lead to a more fuzzy statement of purpose. An important finding of this analysis is that users compare ISM services in groups rather than individually with the exception of those ISM services that they strongly prefer.

Our study helps to explain which features of ISM services are valued by their users and how they regard the various ISM services with respect to those features. In this way, results of preference analysis can help an organization to select the ISM services on which they build their social media assets. It can also help ISM service providers to make their services better with respect to their users' preferences regarding their ISM services. Developers of mashups as well as social applications can also create new tools that cover any gaps that become apparent by assessing user preferences. Businesses that are making decisions about using ISM services will benefit from the different categorization systems proposed in this research as well as the rankings of the ISM services. The exploratory nature of this research will also form the basis for a more rigorous study of this little-studied topic. Overall, this research has provided a basis for illuminating both academic and practitioner studies of its subject.

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