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Implementing Web Technologies as Organizational Communication Media: A Study of Employee Adoption Likelihood

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Abstract

As an indicator of adoption likelihood, we studied employee dispositions that impact Perceived Usefulness (PU) of several Web technologies as organizational media. We also examined the acceptability of organization-owned platforms as informal communication media by employee. Employees were studied across two countries with different levels of infrastructure maturity—Spain and Nigeria. Results show that PU of Web technologies is positively impacted by employee usage habits, perceived capacity to facilitate image enhancement, use by persons with whom the employee wishes to relate and the availability of media options on the same platform. Previous notion that PU is positively impacted by media richness was not supported. Results also suggest employee unwillingness to use organization-owned media for informal communication except for job-related conversations that could enhance performance. We recommend approach to planning Web technologies implementation as effective organizational media.

Keywords

web-based media, organizational communication, formal communication, informal communication, employee acceptance, technology acceptance model, perceived usefulness

1. Introduction

The level of adoption of web-based media like social network services and other forms of social media suggest a growing end-user dependence on such innovations for communication (Nielsen, 2011, 2012). Widespread end-user adoption outside the organization notwithstanding, organizational communication directors are likely to continue to make media choices for adoption as organizational communication media. The aptness of such choices is known to be dependent on acceptance by employees (Marler, Liang, & Dulebohn, 2006). As employees may not be immune from the widespread end-user adoption of Web technologies outside the organization, it may be argued that similar technologies implemented for use within the organization are likely to be more readily accepted by employees. In this light, the finding by Cummings, Massey and Ramesh (2009) that employee propensity to professionally use Web 2.0 innovations is positively affected by their personal, external interactions suggest the need to put into consideration employee previous habits in the attempt to implement Web technologies as organizational media. There is however a need to test the validity of this notion across multiple tools among the same set of employees. In this work, we examine the validity of this suggestion across seven Web-based media namely text messaging/chat, voice chat, video chat, social network service, as well

as blog, microblog and wiki. As factors that may be relevant to employee choice making, we further examine the influence of media richness, personal image enhancement and desired identification on employee perception of usefulness of Web technologies as organizational media.

As pointer to employee acceptance, we base our study on Perceived Usefulness (PU) by employees, a factor which has been found to be dominant in explaining system usage or adoption (McFarland & Hamilton, 2006; Talukder, 2012). While this understanding may be true for formal communication, privacy concerns may cause employees to shy away from media platforms internal to organizations, for informal communication activities. We therefore test the impact of the official nature of such media platforms on perceived suitability for informal communication. We also examine job performance as a factor that could enhance the likelihood to use such platforms for job-related informal communication. A study of employees working in infrastructure-rich (i.e., Spain) and infrastructure-poor (i.e., Nigeria) environments contributes to the generalizability of findings.

2. Theoretical Framework

The need to put end-user acceptance into consideration when planning information technology for adoption cannot be over-emphasized when one considers that information technology implementation failures are frequently attributed to employees' resistance and failure to use the new technology effectively (Marler et al., 2006). Echoing the words of Venkatesh and Bala (2008, p. 273), "the more important issue is how managers make informed decisions about interventions that can lead to greater acceptance and effective utilization of Information Technology". With respect to Web innovations, the impact of employee choices on acceptance may be expected to be higher as the attitude towards such media may have been shaped outside the organizational context.

Acceptance of technology by employees has often been studied using the Technology Acceptance Model (TAM) as conceptual framework. The framework has been used to study the influence of both objective characteristics of media (e.g., media richness) as well as social or experiential factors on employee acceptance. TAM was first developed with the goal of pursuing better measures for predicting and explaining technology use. The model was proposed by Fred Davis (1986) in his doctoral thesis and has been further developed by some other researchers (Davis et al., 1989; Venkatesh & Davis, 2000; Venkatesh et al., 2002; Venkatesh et al., 2003; Venkatesh & Bala, 2008). Numerous support for TAM available in literature makes the model appealing. Venkatesh (1999) presented at least 19 publications with significant empirical evidences in support for TAM (p. 240). As at January 2000, the two journal articles that introduced TAM (i.e., Davis, 1989; Davis et al., 1989) were reported to have been cited at least 424 times (Venkatesh & Davis, 2000). Turner et al. (2010) concluded from their analysis of 73 articles containing 79 relevant empirical studies that behavioural intention to use technology is likely to be correlated with actual usage as originally posited by TAM. We therefore base our study on TAM.

2.1 Technology Acceptance Model

TAM uses the Theory of Reasoned Action (TRA) as a foundation for "specifying the causal linkages between two key beliefs: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), and users' attitudes, intentions and actual computer adoption behaviour" (Davis et al., 1989, p. 983).

Following the causal structure of TRA, TAM provides a basis for tracing the impact of external factors on internal beliefs, attitudes and intentions with respect to technology use. It posits that two beliefs, PU and PEOU are of primary relevance for computer acceptance as shown in Figure 1. According to Davis et al. (1989, p. 985), PU refers to "the prospective user's subjective probability that using a specific

application system will increase his or her job performance within an organizational context" and PEOU connotes the "degree to which the prospective user expects the target system to be free of effort".

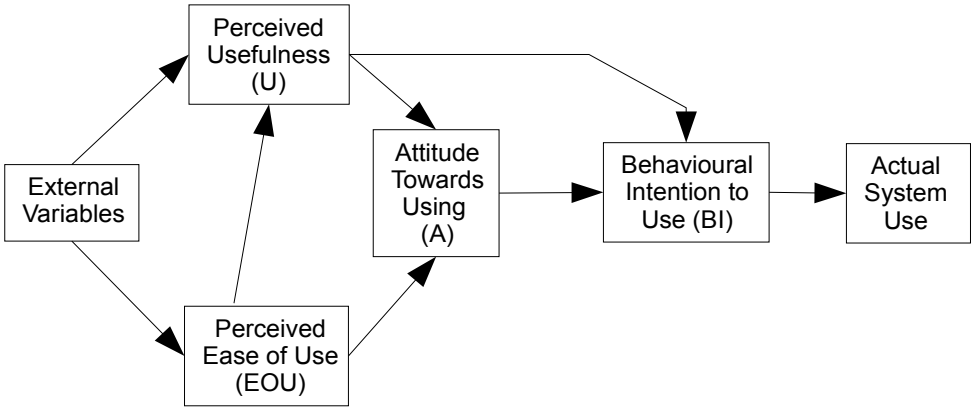

Figure 1. A Schematic View of Technology Acceptance Model (TAM)

As obtainable in TRA, TAM posits that actual computer usage is determined by the Behavioural Intention (BI) to use the system. However, unlike the case of TRA, BI is not only determined in TAM by the attitude toward using the system (A) but also by PU with relative weights estimated by the regression: BI = A + PU. The attitude toward using the system (A) in its turn is jointly determined by PU and PEOU, with relative weights statistically estimated by linear regression: A = PU + PEOU. The model also suggests that PEOU has a direct influence on PU besides the influence on A (see Figure 1).

As a tool for predicting and explaining user behaviour, TAM was further streamlined to include only three theoretical constructs: Behavioural Intention (BI), Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) considering that a test of the direct impact (i.e., without the mediation of attitude towards using, A) of PU and PEOU on BI showed that PU strongly influenced BI directly and PEOU had a small but significant direct effect on BI, although the latter effect subsided over time (Davis et al., 1989). Moreover, the introduction of A into the equation had little effect on the coefficients for either PU, or PEOU, suggesting that although A may partially mediate these relationships; it did not fully mediate them. It is not surprising therefore that TAM is usually referenced in literature (e.g., Venkatesh & Davis, 2000; Venkatesh & Bala, 2008) with the more parsimonious causal structure (i.e., causal structure with fewer steps) shown in the Figure 2.

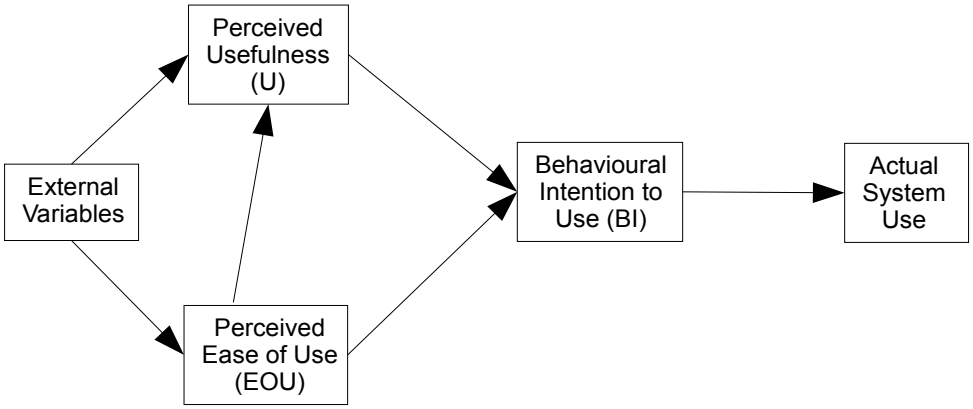

Figure 2. A Schematic View of Technology Acceptance Model (TAM) without the Mediation of Attitude towards Using (A)

2.1.1 TAM2: An Extension of Technology Acceptance Model

Considering that results have consistently shown perceived usefulness to be a strong determinant of intention to use, Venkatesh and Davis (2000) proposed an extension of TAM in order to explain the factors that contribute to perceived usefulness. This is particularly relevant to media implementation as a better understanding of such determinants could pave the way for technology implementations that are more acceptable to employees. They proposed and tested a model shown in Figure 3, which they referred to as TAM2. The model incorporates constructs that determine PU from two process perspectives—social influence processes (subjective norm, image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, PEOU). While the determinants in the social influence processes group address the social forces that influence an individual facing the opportunity to adopt or reject a new system, those belonging to the cognitive instrumental processes group address the conscious intellectual comparison of what a system is capable of doing and what is needed to get the job done.

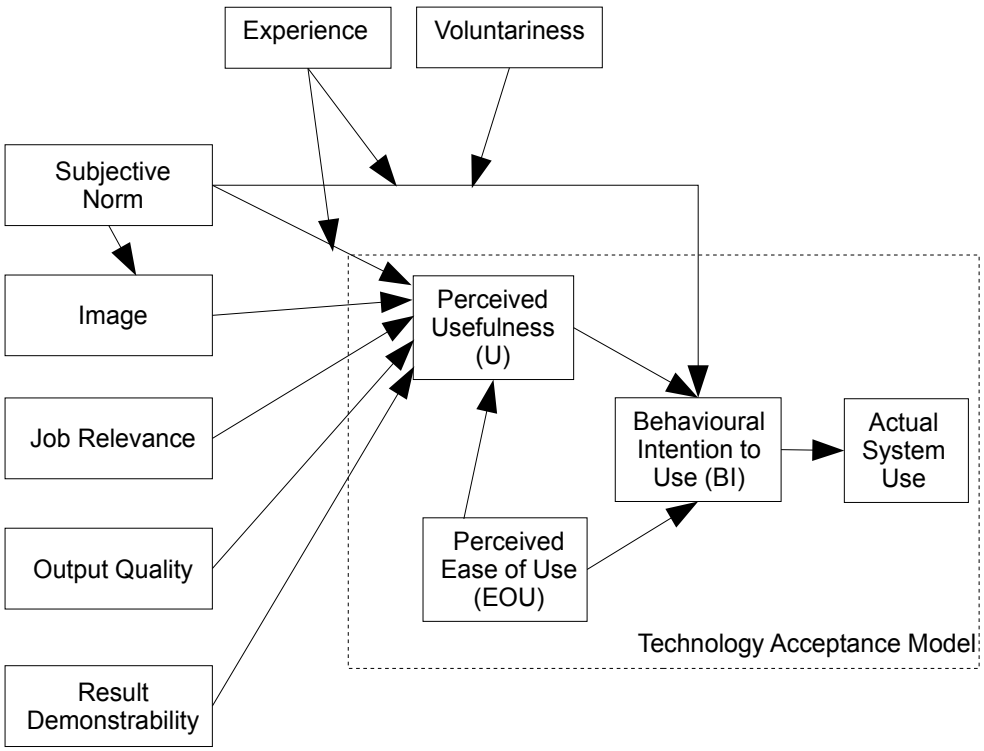

Figure 3. A Schematic View of Technology Acceptance Model 2 (TAM2)

2.1.2 TAM3: Further Extension of the Technology Acceptance Model

In addition to the determinants of PU as presented above, Venkatesh (2000) further proposed some determinants of PEAU, building on the anchoring and adjustment framing of human decision making. The determinants were later integrated with TAM2 to produce yet another extended model referred to as TAM3 (Venkatesh & Bala, 2008) as shown in Figure 4. However, as our focus is on PU as a primary determinant of usage (McFarland & Hamilton, 2006; Talukder, 2012), reference to TAM2 constructs suffices for our study.

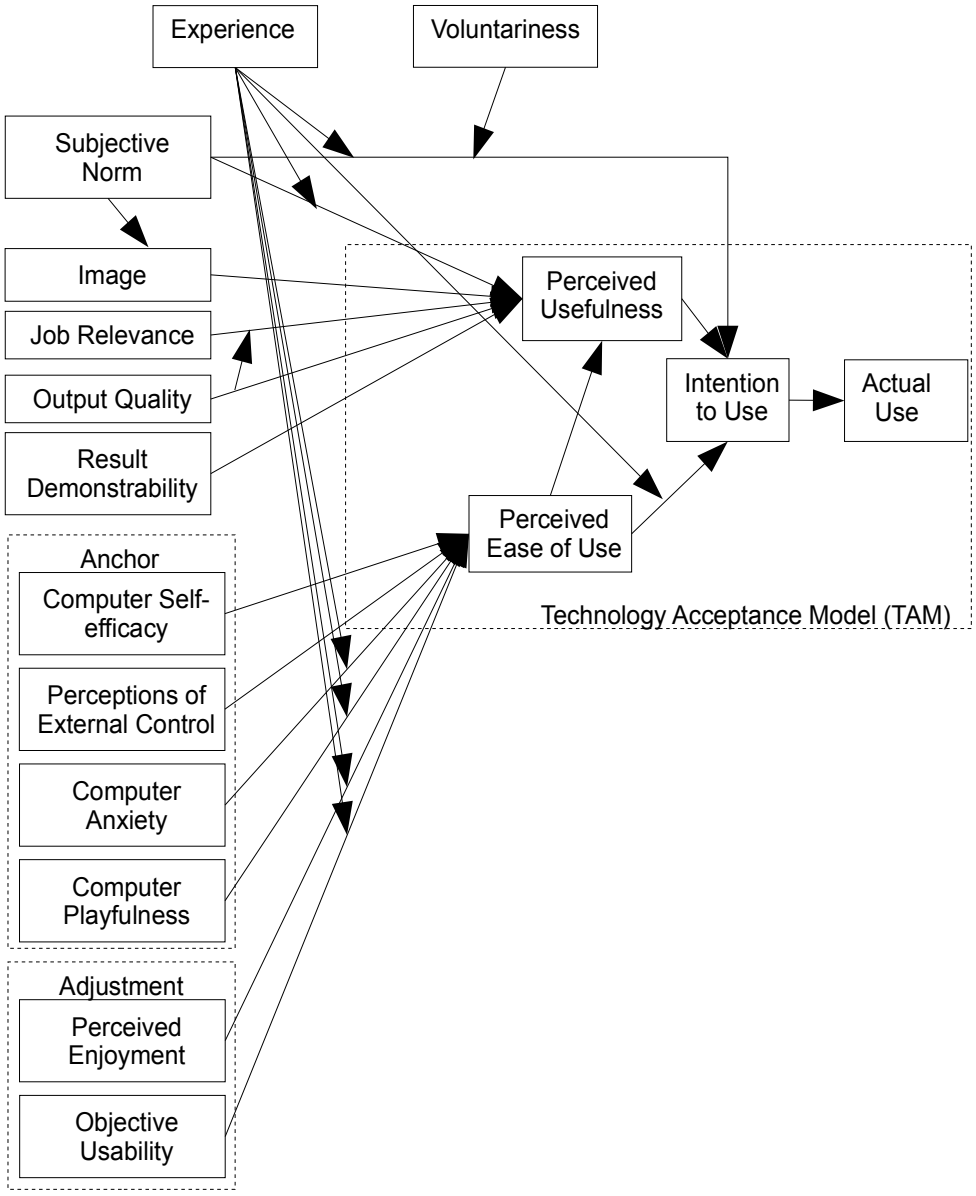

Figure 4. A Schematic View of Technology Acceptance Model 3 (TAM3)

2.2 Hypotheses Formulation

Although the determinants (subjective norm, image, job relevance, output quality, result demonstrability) presented in TAM2 have all been demonstrated to impact perceived usefulness (Venkatesh & Davis, 2000; Venkatesh & Bala, 2008), the impact of subjective norm on perceived usefulness seem to be particularly relevant to media planning. Under the influence of systems usage expectation as a subjective norm established within an organization, findings by Venkatesh and Davis (2000) as incorporated in TAM2, suggest that attitude towards implemented system may vary with individuals. Leveraging on Kelman's (1958) proposed ways by which individuals accept social influences, Venkatesh and Davis (2000) used the notions of compliance, internalization and identification to study and explain different ways by which individuals in organizations accept technology and the impact of such attitudes on the intention to use the system.

According to Kelman (1958, p. 53), "compliance can be said to occur when an individual accepts influence because he hopes to achieve a favorable reaction from another person or group. He adopts the induced behavior not because he believes in its content but because he expects to gain specific rewards or approval and avoid specific punishments or disapproval by conforming. Thus, the satisfaction derived from compliance is due to the social effect of accepting influence". Compared to compliance, internalization seems to reflect a stronger resolve to accept the social influence in as much as the satisfaction derived from it is due to the content of the new behavior itself and not just the social effect of accepting the influence. In the words of Kelman (1958, p. 53), internalization is said to occur "when an individual accepts influence because the content of the induced behavior, i.e., the ideas and actions of which it is composed—is intrinsically rewarding. He adopts the induced behavior because it is congruent with his value system. He may consider it useful for the solution of a problem or find it congenial to his needs". Similar to the case of internalization, identification implies that the individual believes in the content (i.e., the induced behavior, e.g., system usage) which suggests the possibility of an adoption that may be more stable than the case of compliance. However, unlike internalization, the satisfaction implied in identification is not because of the induced behaviour itself but because of its association with the individual's desired relationship. In other words, "identification can be said to occur when an individual accepts an influence because he wants to establish or maintain a satisfying self-defining relationship to another person or group" (Kelman, 1958, p. 53).

The influence of subjective norm, i.e., perceived adoption expectation due to social influence—on the intention to use has been reported to be dependent on whether or not such social expectations are perceived as mandatory or not (Hartwick & Barki, 1994). Individuals in mandatory usage setting where found to place greater weight on subjective norm than voluntary users. It was only among such individuals that subjective norm significantly affected the intention to use in a direct manner. In consonance with Kelman's notion, Venkatesh and Davis (2000) referred to such phenomenon as compliance. In other words, compliance refers to the situation in which individuals develop in a direct manner the intention to use a system in a mandatory adoption setting—e.g., as indicated by organizational authorities. As a way of distinguishing between mandatory and voluntary usage settings, they incorporated into the TAM2 model, the concept of voluntariness—i.e., "the extent to which potential adopters perceive the adoption decision to be non-mandatory" (Venkatesh & Davis, 2000, p. 188)—as a variable that moderates the direct impact of subjective norm on the intention to use.

Compliance approach to adoption seems to lend itself to some adoption instability. As the satisfaction derived from compliance is due to the social effect of accepting influence and not belief in the content of the influence itself (Kelman, 1958), it is not therefore surprising that a compliance approach to technology adoption resulted in a weaker impact on intention to use over time as compared to the impact of perceived usefulness which is positively affected by internalization and identification. Venkatesh and Davis (2000, p. 199) therefore suggested that "practical alternatives to usage mandates based on social information should be developed and tested, such as increasing the source credibility of social information to increase internalization or designing communication campaigns that raise the prestige associated with system use to increase identification". This suggestion is supported by the finding that both internalization of and identification with usage prescription from social actors significantly affected the individuals' perceived usefulness of the system. Perceived usefulness in its turn positively affected the intention to use in a more stable manner than the direct effect of compliance on intention to use.

Internalization and identification were incorporated into TAM2 as mechanisms by which subjective norm can influence intention to use indirectly through perceived usefulness and as attitudes that can occur in both mandatory and voluntary contexts of system use. The identification effect in TAM2 is captured by the effect of subjective norm on image, together with the effect of image on perceived usefulness. With identification as its source, image is used in TAM2 in the sense that "if important members of a person's social group at work believe that he or she should perform a behavior (e.g., using a system), then performing it will tend to elevate his or her standing within the group" (Venkatesh & Davis, 2000).

Applying the TAM2 arguments as presented above regarding the impact of subjective norm on the intention to use, it seems appropriate to pursue an approach to media implementation that incorporates media with values that are internalized by employees as well as the possibility of facilitating individuals' identification increase due to the self-defining relationship established or maintained by virtue of the usage of such media. In other words, media proposed by organization for internal use (i.e., the subjective norm) is likely to lead to a more stable intention to use by the employees if preceded by perceived usefulness as fostered by internalization and identification on the part of the employees. On the contrary, reliance on share compliance could lead to direct but non-lasting intention to use such media. A principal concern ought therefore to be how to facilitate the said internalization and identification with the goal of building lasting intention to use. Based on TAM2 principles, Figure 5 illustrates the flow from an organization's mandate (i.e., the subjective norm) to the intention to use (which is followed by actual use) through compliance, identification or internalization as employees' processes of attitude change towards the mandate. As illustrated, the preferred path to establishing the intention to use is through internalization or identification and not through compliance.

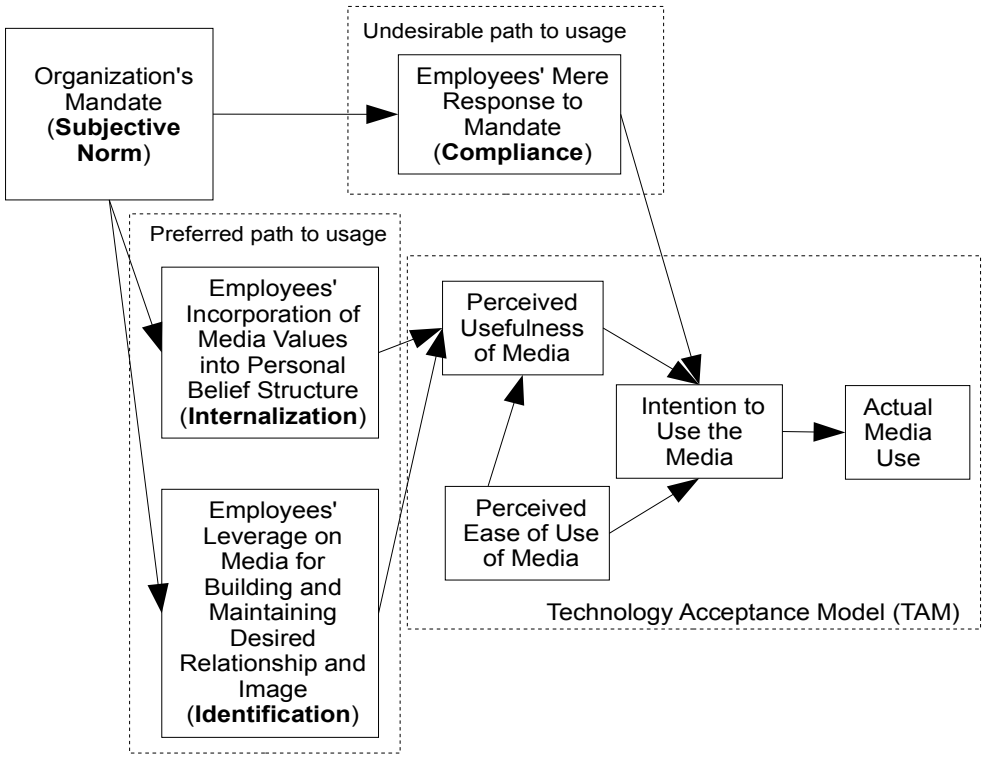

Figure 5. An Illustration of Paths from Organization's Mandate (Media Plan) to Media Usage

The phenomenal, voluntary (non-mandatory) adoption of Web-based media like social media seems to suggest that many end-users (outside organization context) may have to a large extent incorporated the values inherent in such media into their personal belief structure, a situation which could foster PU of the media leading to sustained intention to use. In an organizational context, media plan involving such Web-based media could facilitate internalization of values inherent in the plan with the advantages it entails in favor of stable adoption of organization's plan. This argument seems to be in line with the finding by Cummings et al. (2009) that prior personal experience with Web 2.0 technologies outside the organization does influence the propensity to use such technologies in a professional setting even though moderated by the roles within the organization. The argument also seems fitting with the consideration that Web-based media are typically standards driven, which can consequently lead to similarity in value perception within and outside organizations thus facilitating adoption of organization media plan by virtue of internalization.

As representations of the internalization of values, previous usage habits were captured in two ways. One approach is the frequency of use of Web-based media—text messaging/chat, voice chat, video chat, social network service—for person-to-person. The other is the consumption/contribution habit with respect to media content of blogs, microblogs and wikis. The use of consumption/contribution habit is inspired by the fact that Cummings et al. (2009) estimated employee experience of wikis outside the organization on the basis of both consumption and contribution. Complementing this approach with the frequency of use of tools at the service of person-to-person communication is informed by the advancements in the maturity and adoption of such tools in the Web environment.

We therefore propose the following hypotheses to this effect.

H1: Frequency of use of Web-based media positively impacts employee perception of their usefulness for organizational communication.

H2: The contribution/consumption ratio of blogs, microblogs and wikis positively impacts employee perception of their usefulness for organizational communication.

The high level of non-mandatory adoption of Web-based media outside the organization may not be unconnected with the desire to maintain certain relationships and image on the part of the end-users. For example, some researchers suggest that the desire for self-presentation usually done through self-disclosure is often a driver of personal publication in cyberspace (Kaplan & Haenlein, 2010; Schau & Gilly, 2003). In the context of organizations, employees may not be immune to such desires. The following hypothesis is therefore proposed to this effect:

H3: Usage by persons whose relationship is desired by employee, positively impacts the perceived usefulness of media.

In line with TAM2's proposal that image enhancement positively impacts PU, we further propose the following:

H4: Availability of community publication of the level of contribution will positively impact perceived usefulness of media by employees.

This idea is connected with the concept of community equity as an evaluation of the participation of an individual within a given community as proposed and filed for a U.S. Patent by Peter Reiser and Paul Diamond of SUN Microsystems. Information available from the published patent application document suggests that the community equity concept was proposed with the background consideration that an individual participating in a community may be interested in tracking the status in the community. There is however a need to empirically test for possible impact of capture and publication of contribution level on the PU of the media used for participation.

Media richness has been reported to positively impact perceived usefulness of social media. For example, Lee et al. (2007) concluded from their research on MMS usage that perceived media richness significantly affected the shaping of the beliefs (i.e., PU, PEOU and perceived enjoyment) on the part of users. Similarly, the results of a study among users of Second Life, a virtual world Web-based media suggests that media richness positively affects the PU and PEOU of Second Life in a highly significant manner (Saeed et al., 2008). We therefore propose the following hypothesis for study across various Web-based media.

H5: Media richness positively impacts the perceived usefulness of media.

With the proposed hypotheses in perspective with respect to factors affecting PU, a further illustration of the elements that may be put into consideration in proposing Web technologies as organizational media is as shown in Figure 6.

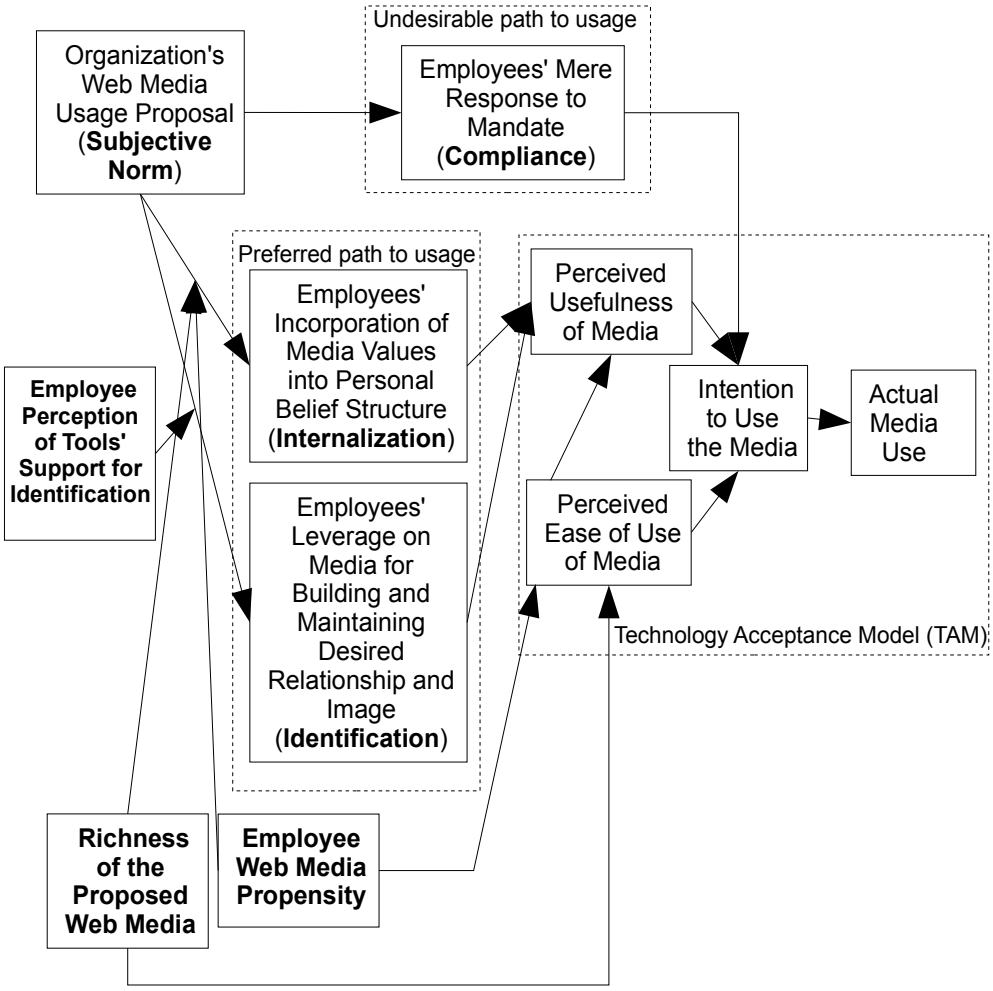

Figure 6. An Illustration of Pathways to Media Plan Usage by Employees and the Moderating Effects of Employee Perceptions, Habits and Media Richness

The possibility of variations among employees' internalized media values in itself could pose a challenge to unified media plan enactment while at the same time avoiding adoption by compliance. The non-adoption risk due to such challenges may however be mitigated by implementing media that

intrinsically support embedded options. Such options could be with respect to the support for different information flow channels as distinct ways of participating in the same communication interaction. In other words, various participants may be engaged in a given communication interaction leveraging on different capacities of the media. For example, some users may participate in a virtual meeting through audiovisual means while others may opt for audio-only, all on the same platform. Media access cost may account for example for difference in choice between individuals in infrastructure-rich environment and infrastructure-poor environment. We suggest that availability of embedded options—be it at the service of personal idiosyncrasies, desired intimacy level or desired participation structure—in itself may be perceived as additional value. We therefore propose the following hypothesis:

H6: Availability of embedded communications options in a medium positively impacts its overall perceived usefulness for communication.

While the above hypotheses may be more readily perceived as applicable to the planning of formal communication channels be they hierarchical, lateral or mass media in nature, perhaps the most difficult channel to plan for is that of informal communication considering that such channels may be rejected by employees if considered officially monitored. The arguments that organizations stand to gain from healthy informal communication however suggest the need to care for such channels. Perhaps the strongest advocate for informal communication network which has often been referred to as the grapevine (Davis, 1953; Davis, 1973; Mishra, 1990; Goldhaber, 1993; Pace & Faules, 1994) is Keith Davis as reflected in the following statement in an article published in Harvard Business Review in 1958: “No administrator in his right mind would ever try to abolish the management grapevine. It is as permanent as humanity is. It should be recognized, analyzed, and consciously used for better communication” (p. 1). Besides complementing formal communication, grapevine has been suggested to meet the natural socialization needs of employees especially with respect to the deep psychological need of people to talk about their jobs and company as a central life interest (Davis, 1973, p. 54). In addition, the grapevine as a social network, can also be an excellent way for internal communicators to connect with their employees effectively and inexpensively (Whitworth, 2006).

In the context of organizational media enactment, a key question is whether employees may not be uncomfortable with informal communication on an organization controlled platform as their conversations may be persisted on such platforms. We therefore propose the following hypotheses for further studies among employees:

H7: Official media enactment negatively impacts perception of media suitability for informal communication.

H8: Internet cloud deployment increases confidence in media suitability for informal communication.

Complementary to the above two hypotheses, we suggest that employees may be favorably disposed towards utilizing organization-owned media for job-related informal communication as captured in the following hypothesis:

H9: Embedding chat media in workflow process increases acceptability for informal communication.

3. Method

The study was conducted by way of survey among employees using questionnaire as instrument for data collection. A 7-point Likert scale was used where appropriate in order to capture the intensity of employee experience represented by the question. After appropriate codification of variables to match the proposed hypotheses, Pearson Chi-square measure was used primarily for significance testing of the

relationship between variables under comparison in line with the hypotheses formulated. It was however replaced with Fisher's Exact test and Monte Carlo significance approximation which provides more exact significance value when any of the cells (in the cross-tabulation between variables under comparison) have expected frequency of less than 5. In addition, Cramer's V coefficient, a measure of association between variables was further used as a confirmation of the substantive presence of a relationship between the variables.

3.1 Reliability

Questionnaire reliability test was carried out using Cronbach's alpha. Different sets of related items in the questionnaire were tested for internal consistency. In the first place, the Cronbach's alpha for the responses to the questions on frequency of use of named Web-based media was 0.867. Analysis of the responses pertaining to the ease of use also resulted in a high value of 0.846. The set of responses pertaining to perceived usefulness of tools for organizational communication likewise yielded a high Cronbach's alpha value of 0.852. Question which had to do with the possible leverage on tools for the visibility and acknowledgement of desired image within the organization also had a high value (0.865) across the tools studied. Questions pertaining to consumption/contribution pattern of blogs, microblogs, wikis also gave a high value of 0.807. The latter variables being all nominal in character, Cronbach's alpha value was estimated in the context of multiple correspondence analysis as applicable to nominal variables.

Conventionally, a Cronbach's alpha value between 0.7 and 0.8 is considered acceptable. Better still, values between 0.8 and 0.9 (as obtained in this work) are not only acceptable but considered to be good.

3.2 Study Population

The population of study included the combination of employed people in Spain and Nigeria. In order to facilitate access from different parts of both countries, questionnaire was published online using the survey service available at http://www.encuestafacil.com and the link was sent by email or through social network messaging to prospective respondents.

For reasons of subject diversity as well as reaching sufficient number of employed people in both countries, effort was made to reach the alumni members of the University of Navarra, Pamplona and Pan-Atlantic University, Lagos. This effort was complemented with a general appeal to friends and acquaintances to spread the message to as many people as possible that work in Spain or Nigeria. LinkedIn, a social network service primarily focused on networking among professionals, was leveraged on to send individual requests to prospective respondents, in an attempt to maximize returns from employed people who are the target of the survey. About a thousand of such messages were sent through LinkedIn.

4. Result

Six hundred and eighty-five responses were received online from respondents, 413 in Spanish language and 272 in English language. After data cleansing, a total of 556 cases were available for analysis, 352 from Spain and 204 from Nigeria. Of the 556 cases, 419 were from male respondents and 137 from female respondents. Though respondents cut across age ranges most (78.2%) were within the age ranges of 25 to 34 (39.9%) and 35 to 44 (38.3%). Next in the order of representation was the age range of 45 to 54 (14.2%). The least represented age groups were those above 64 and those below 25.

Besides gender and age, respondents were distributed across various industry sectors. Education was most represented (18.9%) and closely followed by professional firms and services (17.8%) as well as

telecommunications/information and communication technology (16.5%). A number of respondents also came from sectors like media and entertainment (10.4%), financial services (6.8%), manufacturing (6.7%), health sector (4.3%), power, energy and utilities (4.7%) as well as government and public sector (3.2%). The variety of industry sectors went beyond the groups presented in the questionnaire. Others indicated by respondents include sectors like construction, Non-Governmental Organizations (NGOs), research, culture, tourism as well as sports.

Similar to the sectors of work, the nature of work within the respective organizations were also quite varied. It may be worthwhile to note in this regard that even though the highest proportion of respondents were from the educational sector, teaching activity was not the most represented (9.2%). General management/administration had the highest representation (18.5%) followed by client services (11.7%). Some other represented work types include internal information technology services (8.1%), production (6.1%), sales (5.9%), customer relationship management (4.5%), accounting and financial control (4.1%), human resource management (2.9%), facilities maintenance services (1.8%), supply chain management (1.8%). Others include legal, editing, library, research and development, broadcasting as well as safety related tasks.

4.1 Hypotheses Test Results

H1 and H2. Fisher's exact test was used to examine the relationship between frequency of use of various Web-based media and employee perception of usefulness for organizational communication as well as the relationship between consumption/contribution habits and perceived usefulness of blogs, microblogs and wikis. Prior to statistical test, blog, microblog and wiki consumption/contribution patterns were transformed into variables with four response frequency groups. The frequency groups which include "more of consumer", "more of contributor", "equal consumption and contribution habit" and "neither consumer nor contributor" reflect the habits under consideration. The frequency of use of text chat, voice chat, video chat and SNS were also transformed into variables with aggregated response frequencies. Groups in this category include "non-user group", "rare-user group", "occasional user group" as well as "frequent user group". Perceived usefulness of the respective tools was transformed by the aggregation of reported frequencies into useful, useless, I can't say.

As shown in Table 1, in all cases, the usage habits impact the perceived usefulness of the respective Web-based media: text messaging/chat ($p < .01$), voice chat ($p < .001$), video chat ($p < .001$), social network services ($p < .001$), blog ($p < .001$), microblog ($p < .001$), wiki ($p < .01$). Both hypotheses H1 and H2 are therefore accepted. The values of Cramer's V suggest that all associations are within the acceptable ranges. Microblog showed the strongest relationship followed by SNS, voice chat and blogs.

Table 1. H1 and H2—Test of Association between Usage Habit and Perceived Usefulness

Web-based media	Fisher's exact test (two-sided p-values)	Cramer's V
Text messaging/chat**	.001	.154
Voice chat***	.000	.250
Video chat***	.000	.183
Social Network Service***	.000	.258
Blog***	.000	.210
Microblog***	.000	.338
Wiki**	.001	.159

A Common trend among the tools studied is the fact that the proportion of respondents that indicated perceived usefulness consistently increased from non-users to frequent user groups as can be visualized in Figure 7. Usage habit as seen from a consumption/contribution perspective suggests that the proportion of respondents indicating usefulness of tool tends to increase in the direction of increase in contribution habit as can be visualized in Figure 8.

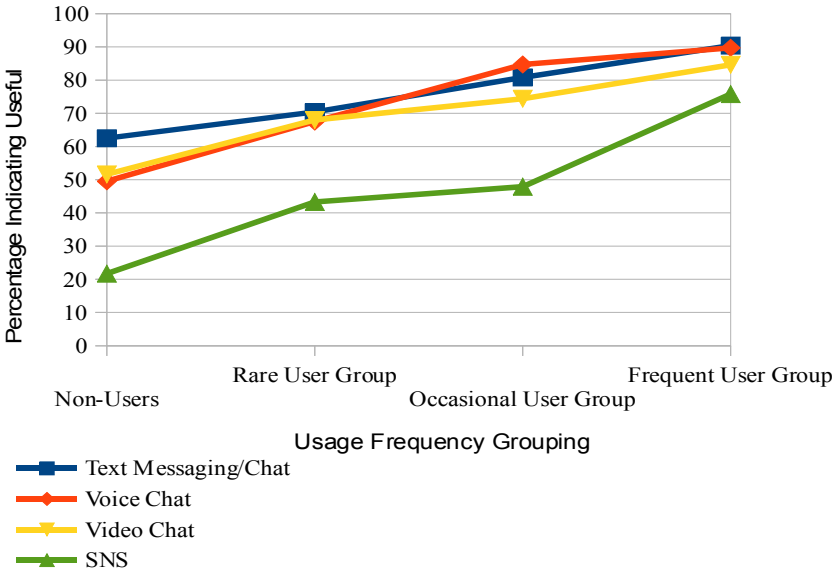

Figure 7. Usage Frequency and Proportion Indicating Tool as Useful

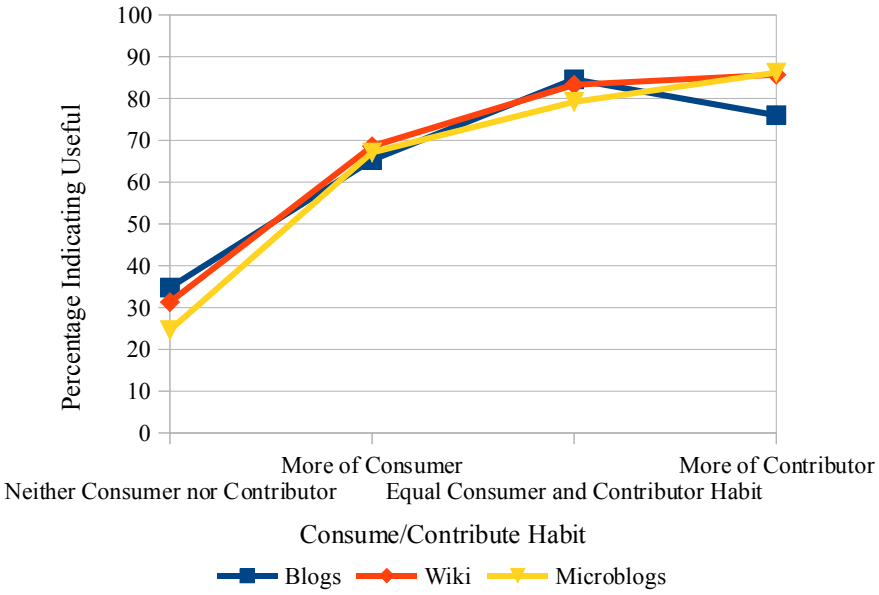

Figure 8. Consumption/Contribution Pattern and Proportion Indicating Tool as Useful

H3 and H4. In hypothesis H3 it was postulated that usage of Web innovations by other persons (e.g., colleagues) to whom a given employee wishes to relate, is likely to have an impact on the perceived usefulness of tools by the employee. In other words, the desire to maintain certain relationships could have a positive impact on the perceived usefulness of tools known to be in use by the other party. Consequently, respondents were asked about their awareness or lack there of such usage. The hypothesis was supported for all the tools studied ($p < .001$, two-sided). In all cases the proportion of respondents indicating usefulness of tools is higher where the respective tools are known to be in use by individuals to whom the employee (respondent) wishes to relate. Figure 9 is an illustration of the consistency of finding across all the tools studied. Similar trends were observed across both countries studied as well as across gender.

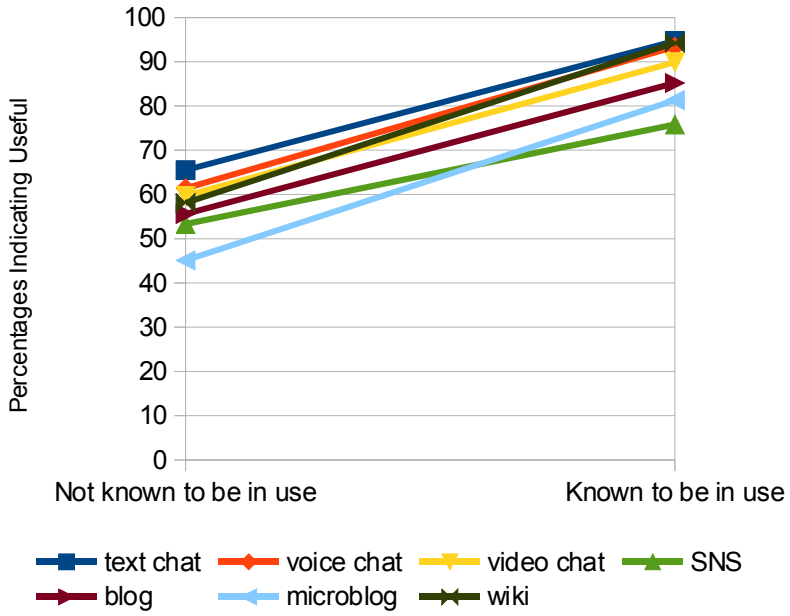

Figure 9. Desired Relation's Usage Awareness and Percentage Declaring Respective Tools as Useful

Closely related to H3 postulation, in as much as both have to do with identification sought by an employee, is the postulation (H4) that perceived usefulness of a given tool for desired image enhancement would positively impact the perceived usefulness of such tool. Employees were asked to indicate whether blog, wiki and internal digital newsletter are likely to be useful for the visibility and acknowledgement of their personal contributions. Similar to H3, Fischer's exact test of relationship with PU shows that H4 was very highly significantly ($p < .001$) supported for all the tools investigated. As shown in Tables 2 and 3, the strength of relationship as represented by the Cramer's V values were generally higher for H3 and H4 than the cases of H1 and H2. This finding suggests that identification is likely to be a stronger determinant of perceived usefulness than internalization.

Table 2. H3—Test of Association between Usage by Desired Relation and Perceived Usefulness

Web-based media	Fisher's exact test (two-sided p-values)	Cramer's V
Text chat***	.000	.382
Voice chat***	.000	.360
Video chat***	.000	.311

Table 3. H4—Test of Association between Perceived Usefulness for Image Enhancement and Perceived Usefulness as Organizational Communication Media

Web-based media	Fisher's exact test (two-sided p-values)	Cramer's V
Blogs ***	.000	.358
Internal digital newsletter ***	.000	.217
Wiki ***	.000	.352

H5. Drawing on the results of some earlier research works (Lee et al., 2007; Saeed et al., 2008) it was posited that media richness will positively impact perceived usefulness of Web-based media. Findings in this work however does not support this position.

When asked to choose among tools (email, text chat, voice chat, video chat) with varying degrees of richness as preferred option to face-to-face, preferences indicated were not in the order of richness of the various media even though the medium that had the highest proportion was video chat (36.5%). Email was the second highest chosen (34.6%) followed by text chat (19.3%) and the last of all was voice chat (9.6%). Going strictly by the order of richness, video chat ought to have been followed by voice chat (which has added advantage of non-verbal cues like tone of voice), and then text chat (due to its support for presence awareness and the immediacy of interaction). The last but not the least ought to have been email. Although the majority chose video chat, the richest among the options, the above results suggest that perceived usefulness may not strictly speaking be ruled by gradation of media richness as the next to video was email. This observed trend is common to both countries studied although the best option to face-to-face varied significantly between them, $\chi 2$ (3, N = 488) = 19.486, p < .001. The major disparity between the two countries seems to lie in the choice of text chat and email. The Spanish respondents were more disposed towards email (38.3%) as a replacement of face-to-face than the Nigerian respondents (27.9%) while the Nigerian respondents were more disposed towards text chat (29.7%) than the Spanish audience (13.6%). Though less pronounced than the cases of email and text-based chat, the proportion of Spanish respondents (38.6%) indicating video chat was slightly higher than the equivalent proportion (32.6%) of Nigerians. The latter may not be unconnected with the differences in the availability of Internet bandwidth. Unlike the case of countries, there was no significant difference between male and female respondents.

Another consideration which suggests the acceptance of H5 null hypothesis is the finding that in general, independent of whether the purpose is as a replacement to face-to-face or not, text-based chat had the highest proportion of declaration as useful (87%) compared to voice chat (74.1%) and video chat (69.7%). Email (though expressed as Webmail, thus placing it in the contest of the Web), had an even higher proportion (92.1%) that declared its usefulness. Once more, this order of declaration of usefulness does not correspond to levels of richness across the various media.

A comparison of chosen option to face-to-face with the corresponding proportion of respondents that marked the tool as useful seems to suggest that the choice of face-to-face replacement may be at least partly driven by perceived usefulness of the tools under consideration. As presented in Table 4, except

in the case of Webmail, the highest percentage of responses indicating each tool as useful corresponded with the highest proportion that chose the same tool as face-to-face replacement. For example, among those that chose voice chat as the best option to face-to-face, 92.9% of them also indicated voice chat as useful which is the highest among the various options to face-to-face choice groups. Similarly, the highest proportion of those that indicated video chat as useful (81%) can be found among those that indicated video chat as the best option to face-to-face.

Table 4. Comparison of Face-to-Face Option Selected with Corresponding Perceived Usefulness of Option

Option to Face-to-Face Chosen	Percentage of Responses indicating Usefulness			
	Text	Voice	Video	Webmail
Email	74.8	61.6	56.7	91.1
Text chat	95.5	72.7	69.8	90.8
Voice chat	95.2	92.9	71.4	92.9
Video chat	91.7	81.4	81.0	94.0

H6. Reported perceived usefulness of Intranet if it simultaneously contains different options for communication was tested for significance in frequency differences using chi-square test of goodness of fit. Result shows that there is a highly significant difference between the response frequencies, $\chi 2$ (2, N = 465) = 644.994. As the majority of respondents indicated perceived increase in usefulness, the hypothesis is supported. While there was no significant difference across gender, employees in Nigeria were significantly more positive about the usefulness of the said combination of options on organization's platform than employees in Spain. However, within each country, majority of respondents indicated increase in perceived usefulness. This perceived usefulness of platforms with availability of options may not be unconnected with the experience in the adoption of social network services by consumers. Such platforms are known to incorporate different options for communication. Service providers like Facebook and Google seem to drive their platforms towards making several options available (text messaging/chat, voice chat, video chat, blogs, etc.). The results of this study suggest that organizations ought to share this same vision as it is likely to positively impact employees' perception of usefulness for organizational communication.

H7, H8, H9. The acceptability of organization established media for informal communication was tested among employees. The Chi-square tests of goodness of fit are as shown in Table 5. In the first place, feedback from respondents shows that the H7 null hypothesis is not supported thus suggesting that an official enactment of media is likely to negatively impact the perception of suitability as informal channel of communication. On the contrary, availability of such tools in the Internet cloud (not organization controlled) favors their perception of suitability for informal communication, thus rejecting the H8 null hypothesis. Both findings are very highly significant ($p < .001$). These inferences are based on the fact that most respondents expressed comfort with using non-organization owned social network service for informal communication with colleagues while at the same time, the majority indicated that they are likely to avoid the use of organization-owned social network service for such communication activities. The comparisons of these two circumstances across gender and the two countries included in the study show similar patterns of possible acceptance or rejection of such tools although significant differences exist between the two countries. Such differences are however not in

opposition but are with respect to the number of respondents that expressed willingness or lack thereof to use such tools. In this regard, employees in Spain seem more sensitive to the privacy of informal communication than the Nigeria-based employees. Such sensitivity difference can be seen in the fact that, 74.2% of the respondents from Spain expressed likelihood to avoid the use of organization-owned SNS for socialization with colleagues as compared to 49% for Nigeria. In addition, a higher proportion (75.5%) of Nigerian respondents expressed comfort in the use of non-organization owned SNS for socialization with colleagues as compared to 62.4% for Spain.

These findings corroborate the proposition that informal communication channels may be the most difficult to plan for, as employees may be sensitive towards the possibility of their informal conversations being persisted or monitored on organization-owned platforms. From the perspective of possible benefits of informal channels as avenues for quick spread of organizational information as well as feedback, positive disposition towards socializing with colleagues on non-organization owned SNS could be beneficial to the organization. Unfortunately, however, harnessing collective intelligence hidden in such informal conversations remains a challenge. In this latter regard, the results pertaining to hypothesis H9 seems to throw some light on a possible way forward, namely the embedding of informal channels within workflow systems.

The level of comfort expressed with respect to the use of external SNS for informal communication with colleagues as in H8 would suggest that organizations may take for granted that employees are likely to take the initiative to use such SNS as informal communication channels. Where discretion concerns exist, there may be a need for orientation with respect to employee awareness of privacy policy on such platforms in favor of due discretion. For example, employees could be encouraged to create groups specific to co-workers on public SNS platforms as a way of restricting information flow pertaining to organizational matters to co-workers.

With respect to H9 majority of respondents indicated likelihood to use chat tool on Intranet if available, in the context of work at hand ($p < .001$). Once more, the Nigerian audience were significantly ($p < .05$) more open in this regard than the Spanish audience. However, in general, the likelihood to use chat tool on Intranet shows no relationship with the likelihood to avoid organization-owned SNS for informal communication with colleagues. Besides, 65% of those that indicated likelihood to use chat tool on Intranet indicated that they are likely to avoid the use of organization-owned SNS. This latter finding hints at the idea that informal conversation useful to work effectiveness are likely to be treated differently from other informal conversations by employees with respect to their choice of channel. Such reasoning seems to make sense when one considers that the likelihood to use chat tool on Intranet was significantly related to comfort in using non-organization owned SNS ($p < .05$). In other words, employees may be less concerned about the fact that a platform is organization owned when what is at stake is effectiveness at work even though the conversation may be informal. Such work-related informal conversations fortunately could be quite useful to organizational knowledge base as part of harnessing collective intelligence. Herein lies the suggestion to embed informal channels of conversation within workflow systems.

Table 5. H7, H8, H9—Chi-Square Tests (Goodness of Fit)

Web-based media	Significance of Chi-square test (Goodness of fit)
Likelihood to avoid the use of organization owned SNS for informal Communication ***	.000
Comfort in use of non-organization owned SNS for	.000

informal communication ***	
Likelihood to use chat tool on intranet for work-related informal communication ***	.000

5. Conclusion

We conclude that the perception of usefulness of Web technologies as organizational communication media is positively impacted by employees' usage habits of such technologies as well as their perceived facilitation of desired image and identification. We did not find support for the notion that perceived usefulness is positively impacted by media richness. Instead, the availability of communication options on the same technology platform positively impacted the perceived usefulness of such platforms.

The positive impact of usage habits is in agreement with the notion of Cummings et al. (2009) that prior personal experience (consume, contribute) with Web 2.0 technologies outside the organization does influence the propensity to use such technologies in a professional setting. Besides confirming this position across various tools (i.e., text messaging/chat, voice chat, video chat, social network service, as well as blog, microblog and wiki) we have further shown in this work that the impact of employee usage habits of blog, microblog and wiki on perceived usefulness tends to be greater among content contributors. In addition, we have demonstrated that frequency of use is a determinant of perceived usefulness but that perceived facilitation of image or identification is a stronger determinant of perceived usefulness than usage habits.

These findings point to a way to leverage on TAM constructs for the evaluation of employee habits or expectations that would favor internalization and identification as preferred paths to the intention to use Web technologies implemented as organizational media. In this respect, the following recommendations may be made regarding the process of organizational media planning involving Web technologies: (1) Draw up a chart of Web technology based media, with characteristics that can be mapped to media needs of organizational communication based on objective criteria for effectiveness, (2) Get input from employees regarding other Web technology based media that could be incorporated into plan and update the chart, (3) Check the frequency of use by employees of tools under consideration for adoption. Give priority to those in frequent use, (4) For content tools like blogs, check the consumption/contribution habits and favor tools for which employees exhibit more contribution habit, (5) Give priority to tools in use by known opinion leaders within the organization. Our findings suggest that influence of opinion leaders may even have more positive impact on employee acceptance than frequency of use by employees. Promote among such opinion leaders the usage of tools objectively considered to be valuable but scarcely in use among employees, (6) Incorporate tools that could favor the visibility and recognition of contributions by employees. Introduce the concept of social or community equity. Once more, this may be even more important than frequency of use consideration, (7) Sharing the same vision as social network services, implement options for communication on the same platform.

For informal communication, we recommend the embedding of interactive tools like chat into platforms designed for workflow process automation. Findings in this work suggest that employees are likely to use such tools for informal communication that could have positive impact on their job performance.

We suggest further research on experimental basis that would involve the implementation of the above recommendations in an organizational context and a longitudinal study of the sustained, effective use of the implemented systems by employees.

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