Mobile Phone Usage of Young Adults: The Impact of Motivational Factors

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ABSTRACT
To increase marketability in a competitive and technologically evolving market designers are compelled to add new features to mobile phones. This often leads to 'featuritis' with hit-and-miss success rates. Our research goal is to find a more informed point of departure for feature addition activities that will improve design and maximise return on investment. We argue that a human motivational factor focus could provide a solid grounding for judging whether features are likely to be used, or not. In this paper we address the motivational factors that underlie mobile phone use by young adults aged between 18 and 30. We consider models for motivational factors from psychology and consumer science, as well as mobile phone usage space models, including the mobile phone usage space model (MUSM). MUSM proposes linking usage spaces to motivational factors, but does not explicitly investigate the mapping of features to the identified usage spaces. In this paper we investigate the features associated with individual MUSM usage spaces as well as the ranking of the usage spaces for our specific target group.

Categories and Subject Descriptors
H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms
Design, Human Factors

Keywords
Mobile phone usage, motivational factors, mobile phone features.

1. INTRODUCTION
This paper concerns the impact of motivational factors on mobile phone use profiles and the influence thereof on the design of mobile phones. It aims to provide an alternative to the current feature driven design perspectives.

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Technological developments, together with market forces, have led to the situation where mobile phone design is feature-driven (features here include both the characteristics of the handset and the functionality and services provided by means of the device). Competition drives the escalating addition of features, often leading to 'feature creep' [26] or 'featuritis' [27]. This is driven by the need to increase the demand and desirability of the product, as compared to other similar products in the marketplace. Sometimes the addition of a feature does indeed provide a return on investment for the user. In reality, the addition of features often has the undesirable effect of reducing usability [35], and tends to be counter-productive as many users find it difficult to cope with the consequent information overload and cognitive demands involved [6, 27, 35]. For example, the trend to design smaller phones resulted in a severe reduction in the usability of the device and does not provide the expected competitive edge [3]. The primarily feature-driven approach, then, appears to be flawed, a conclusion that has also been reached by other researchers (e.g. [18, 35]).

The following question then begs an answer: When does a specific feature constitute value to a user? We argue that, in order to answer this question, we have to gain a better understanding of the user's needs and requirements. The immediate argument would probably be that this is nothing new: human-computer interaction (HCI) has been about user needs and users requirements all along. Current HCI approaches to determine user needs and requirements, however, focus primarily on tasks and the context in which the tasks are to be executed, mostly a 'work context'. Mobile phones, in contrast, are primarily personal devices (a device used by a single individual to achieve those individual's personal goals (not necessarily work-related)). We therefore argue that one should take one step further back and also look at the fundamental issues that influence the mobile phone user to want to perform a specific task or use a specific feature to perform a task. This paper considers well established theories of motivational human factors as a possible alternative point of departure in deciding which features to include on a mobile phone.

We argue that if we can form a better understanding of how motivational human factors influence users' actual mobile phone usage, we can formulate a model that effectively communicates categories of mobile device usage that align with such identified needs. The next step will then be to link mobile device features with the needs reflected in the model. The features would then be well founded, by being aligned with the actual needs of the users, and designers would be able to design in a more grounded fashion, rather than following ever-changing market trends or their perceptions of what users want.

In an earlier study the Mobile phone Usage Space Model (MUSM) was proposed [32]. MUSM recommends motivational human needs as a basis for understanding users' mobile phone needs and consequent usage. In this paper we investigate the prioritisation of usage spaces and the mapping of features to usage spaces. Apart from our work we are aware of only isolated references that associate mobile phone use with motivational factors (e.g. Jarvenpaa et. al. [10], Jokela [11] and Schiphorst 29]).

Section 2 of the paper provides the theoretical foundation, highlighting feature-driven research and human motivational factors, while section 3 reviews research on mobile phone usage space models, including our earlier research proposing MUSM. Section 4 describes our research conducted on ranking mobile phone usage spaces and the mapping of mobile phone features to usage spaces. Section 5 discusses the findings from the interviews and the survey, and Section 6 concludes.

2. THEORETICAL FOUNDATION

This section provides the theoretical foundation for this paper by first highlighting examples of feature driven research into mobile phone use in section 2.1 and then discussing human needs related research in section 2.2.

2.1 Mobile Phone Feature-driven Research

The question of identifying appropriate design features is being actively researched worldwide from a variety of perspectives. One perspective relates to the concept of the 'functionality threshold' introduced by Mohageg and Bergman [25], the point beyond which further functionality creates unnecessary complexity. Kiljander [14] highlights the 80/20 rule according to which designers should identify and focus on the 20% functions that will meet 80% of user's task needs. Another perspective is directed at finding the set of key features around which the user interface should be optimised for each target group [7, 10]. The question of finding the critical mobile phone features has been researched extensively by isolating a particular feature or features and then studying those in isolation (see, for example, the studies by Han et al. [7], Ling and Hwang [18] , Alahatuha et al. [1], and Ziefle and Bay [34]).

All these studies have an inherent limitation: they start with specific design elements, features or functions and then try to establish the value of these features. It is untenable to study *all* different combinations of features to produce reliable results, or to predict the possible profitability of new features.

Based on a study of the social effects of m-commerce, Jarvenpaa et al. [10] recommend a move beyond 'nice-to-have' services to 'must-have' services [10]. This classification, which is guided by user needs, seems to be a more realistic approach that does not rely on the reported preferences of individual users based on pre-selected features. In this paper we argue that in investigating the factors that influence mobile phone usage, the user's motivation for using the mobile phone deserves special consideration.

Section 2.2 explore this user need perspective and consider the basic literature on human needs classification. We start off with a discussion of human needs in general, followed by a customer-oriented model linking needs and features (section 2.2.1), and then delve into the associated theoretical basis of this model and other motivational needs models (section 2.2.2).

2.2 Human Needs-driven Research

Human needs are the links between the provisions and demands of the social world and people's tendencies to realize or refute these needs [4]. Lindgren [17] states that in the field of clinical psychology and personality theory a need is defined as a deficit, the lack of something vital and important to the organism. Psychological needs are then seen an extension of this idea, except that psychological needs are generally not considered crucial [17]. Deci and Ryan [4] maintain that psychologists see needs either as a set of innate physiological drivers which must be satisfied for the organism to remain healthy, or as psychological and acquired. They define the psychological needs for competence, autonomy, and relatedness as important and states that these needs must be satisfied on an ongoing basis for people to develop and function in healthy or optimal ways. Apart from personality theories, psychological needs are also linked to motivational needs. Whilst psychological needs can be seen as very much focused on the individual, motivational needs focus on the issue of motivation as the inducement of action, feelings, and thought [5] in a larger social structure and/or workplace.

For the purpose of this study the concept of a need is defined as *something that moves a person to action*. This means that motive or desire can be substituted for need without losing meaning. While this approach may be too coarse for psychologists in general [17, 30], it is functional for this study in the context of mobile phone use.

Qualasvirta [28] argues that human needs last longer than any specific solution and therefore it is better to use needs as a roadmap for design rather than to focus new design on solving perceived problems. This support our endeavour of considering motivational needs as a point of departure in exploring the factors that influence mobile phone usage. Section 2.2.1 considers a consumer needs classification with Kano analysis that applies a needs-driven approach to the problem of feature inclusion while section 2.2.2 reviews motivational human needs theories including those underpinning Kano analysis.

2.2.1 Consumer Needs Classification and Kano Analysis

Kano analysis [12, 13] provides a needs-oriented view of features and is used to classify and prioritize customer requirements from a marketing perspective, based on the way they affect customer satisfaction. Kano's model identifies three types of needs that all customers have, consciously or unconsciously, as depicted in Figure 1:

- Basic needs ('must-haves'): The minimum functions or features that customers expect of a product or service. When absent there is customer dissatisfaction, which can result in complaints or lost business. When fulfilled, these attributes play a role in customer neutrality, i.e. customer satisfaction above the neutral level cannot be achieved by fulfilling only these needs.
- Performance needs ('more-is-better'): Customer satisfaction increases linearly with the availability of the attributes and product price is often related to them.

- Excitement needs ('surprise and delight'): The features or functions that delight and excite customers, involving the unspoken or unexpected needs of the customer. If satisfied, these attributes will contribute to high levels of satisfaction. Satisfaction will, however, not drop below neutral if the product lacks the feature.

Due to advances in technology and user expectations, a specific feature may progress from being a surprise and delight to must-have over a period of time, e.g. SMS started as an attractive feature and now it is accepted as a must-have feature.

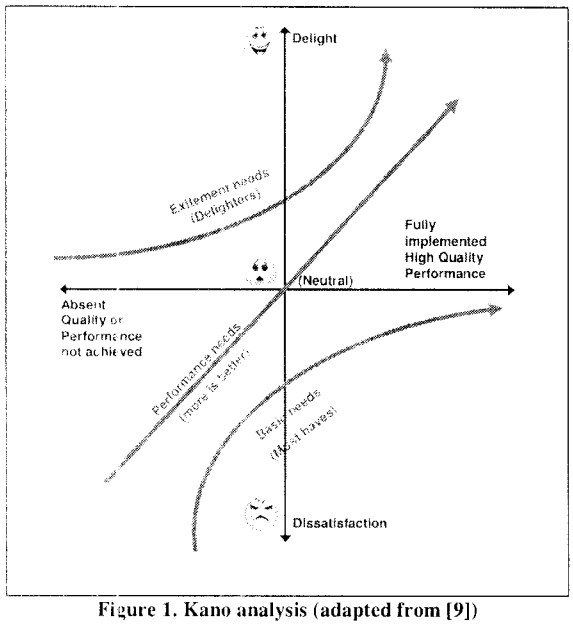

Figure 1. Kano analysis (adapted from [9])

2.2.2 *Motivational Needs Classification*

One of the first theories on motivational needs was proposed in 1954 by Maslow [23]. In 1998 this model was expanded by Maslow and Lowery [24] to represent eight levels of human needs. This model's needs build on each other with lower level needs to be satisfied before higher level needs can be met. The needs, from the lowest to the highest level are: physiological, safety and security, a sense of belonging, affection and love, esteem (both self-esteem and esteem the person gets from others), cognitive, aesthetic, self-realization, and self-transcendence.

The holistic, dynamic view of motivational needs contained in Maslow's theory thus represents needs as interdependent subsets in a process leading to self-actualisation and transcendence [2]. This theory is useful in presenting the fact that needs are related and that one type of behaviour may satisfy a set of needs. Over the years Maslow's model has been researched and heavily criticised for various reasons, one of which the hierarchical arrangement of needs [2].

Kano analysis was inspired by Herzberg's motivator-hygiene theory from the field of industrial psychology [21]. Herzberg discriminates between factors which are referred to as *motivational* versus those called *hygiene* [8]. Hygiene factors meet physiological, safety and social needs in the workplace (as defined by Maslow). Motivational factors encourage job satisfaction and appeal to human needs of growth and self-advancement.

An example of more recent work on motivational needs, as used in practice in a business environment, is published by The Institute for Management Excellence [31], highlighting positive and negative ways in which needs can be met. They claim that each person has three primary needs (varying between individuals), followed by six secondary needs (again a two-tiered approach, as proposed by Herzberg), but that this hierarchy depends on the individual. The set of needs proposed are: security (the need to feel safe and to feel secure about the future), adventure (the need for new experiences and to experience a sense of anticipation), freedom (the need for independence and spontaneity, to have choices and the control over such choices), exchange (the need to trade information and knowledge with others), power (the need to organize and lead), expansion (the need to expand one's horizons), acceptance (the need to accept yourself and be accepted by others), community (the need to socialize and have people around), and expression (the need to be seen, heard and felt).

Despite isolated references associating mobile phone uses with motivational needs [11, 29], no study has specifically investigated motivational human needs as an approach in understanding user's mobile phone needs, and therefore we propose it as a worthwhile and important issue to research.

3. MOBILE PHONE USAGE MODELS

Since mobile phone uses are myriad, they need to be organized in a manageable way. Marcus and Chen [22] propose one possible organisation, using a set of six mobile phone usage spaces overlapping with the core identity space in the centre: identity, relationships, entertainment, commerce, self-enhancement and information.

Marcus and Chen's model provides a feasible starting point for reasoning about uses, but we argue that it should not stop there. Usage spaces should be taken a bit further by considering the possibility of linking usage spaces to motivational human needs and then mapping features onto usage spaces thereby linking features tot motivational needs. To support the proposed linkage between motivational needs, uses and features, we first have to determine the connection from established human needs to documented mobile phone uses. An extensive literature review revealed that, over and above business applications, mobile phones are used to address or satisfy a variety of user needs including [16, 19, 20]:

- Increasing safety and security, e.g. calling for help in emergencies.
- Maintenance of social network, e.g. sending messages or making voice calls.
- Micro-coordination, referring to the use of mobile phones for logistical purposes (organisation of personal and social activities), and hyper-coordination, referring to the use of a mobile phone for self-presentation and personal expression.
- Source of information, e.g. calendar, phone book, diary or internet browsing.
- Entertainment, e.g. games, chat rooms, listening to music or watching television.

- Status enhancement via the brand or mode of the phone.

In earlier research [32, 33] we investigated the link between motivational needs and mobile phone usage by means of a questionnaire driven study involving 177 participants between the ages of 18 and 30. Two data reduction methods, i.e. exploratory factor analyses and optimal scaling, produced similar usage spaces, namely: safety and security, relationships, organisation, personal history. Other additional usage spaces emerged from the literature study and the interviews, namely: personal information, non-personal information, m-commerce, entertainment, image and expansion. Integrating the findings from our survey with those from the interviews and literature survey, we proposed MUSM consisting of a set of ten usage spaces. To evaluate MUSM quantitatively a survey was conducted with 60 participants from the target group. The survey participants were required to rate the importance they attributed to each of the 10 usage spaces presented to them. Using the results from this evaluation and the data gathered during earlier phases of our research, we followed the ideas of Herzberg [8], Kano's model [12] and The Institute of Management Excellence [31] classifying needs in various categories, these usage spaces were grouped into four *core (essential)* and six additional *usage spaces*).

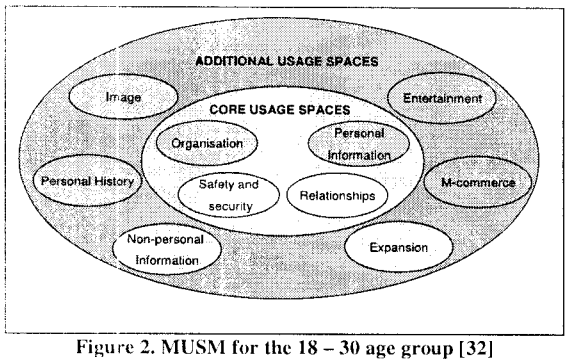

Figure 2. MUSM for the 18 – 30 age group [32]

As illustrated in Figure 2, the core usage spaces are:

- Safety and security: making people feel safe and providing security.
- Relationships: building and maintaining relationships with other people.
- Personal information: storing personal information about the user.
- Organisation: Synchronizing and making arrangements.

The additional spaces included are:

- Non-personal information: information on products and services.
- Entertainment: music, jokes, playing games etc.
- Exchange of information: represented by m-commerce, i.e. buying, selling and financial transactions.
- Expansion: exploring new environments or finding new ways to do things.
- Image (including self-image): enhancing by the appearance, brand, ring tone and accessories.
- Personal history: creating a personal history.

The MUSM model provides a point of departure for linking mobile phone uses to motivational needs, but to complete the model the features associated with each usage space need to be identified. Furthermore, it would also be valuable to get an idea of the priorities users attach to these usage spaces since MUSM distinguished only two groups namely core and additional. Section 4 describes our further research to accomplish this goal.

4. MAPPING FEATURES TO USAGE SPACES

We used two studies to investigate the mapping of features to usage spaces: a larger quantitative study (survey) described in section 4.1 and a small qualitative study (interviews with six participants) described in section 4.2.

4.1 Quantitative study

The quantitative study consisted of a survey where age, gender, language (mother tongue), technological development (measured on reported competency in using e-mail, computers and the Web) and technological orientation (measured in terms of attitude towards new technology) were measured. The subjects were 59 undergraduate computing students (from a university in South Africa), aged between 18 and 30 years with a mean age of 23. Of the students 39 (66%) were male, 16 (27%) female, while 4 (7%) did not indicate their gender. Similar to all our previous studies the participants were multi-cultural. In this study the language distribution (based on mother tongue) were used to indicate cultural diversity. A variety of mother tongue languages were indicated: among the 20 languages listed Setswana (48%) and English (29%) were the most prevalent, whilst other languages included IsiXhosa, IsiZulu, Setswana, SiSwati, Shona, Lunda and Nyanja. Technological development did vary slightly, even though they were computing students. However, all participants had a score of above 60% for technological development and therefore we assumed the group to be homogeneous enough on age and technological development.

Table 1. Summarised statistics

Pearson Chi-Square test	
Chi-Square	2759.4229
DF	256
Asymptotic Pr > ChiSq	<.0001
Monte Carlo Estimate for the Exact test	
Pr >= ChiSq	0.0000
99% Lower Conf Limit	0.0000
99% Upper Conf Limit	4.604E-04
Number of Samples	10000
Initial Seed	418855428

The questionnaire consisted of two separate sections, one capturing responses on the priority attributed to each usage space and the other features associated with each usage space. The aim was to identify the features related to each usage space and also prioritise the usage spaces. Not to influence the outcome of the experiment we did not suggest any linkage between a usage space and certain features, and neither did we indicate any classification of the usage spaces. A random list of 33 features commonly found in newer mobile phones was

presented to the participants and they had to link them to the usage space descriptions provided. A Pearson Chi-Squared test was performed to ascertain if the observed frequencies differ from those that would be expected by chance. The summarised result, depicted in Table 1, provides evidence that the distribution of features across usage spaces is not random.

Table 2. Relationship between needs, usage spaces and features in MUSM

Usage space name and description	Motivational Needs [8, 24, 31]	Features associated with the usage space by target group
Relationships: building and maintaining relationships with other people	Sense of belonging, Community, Acceptance	SMS, calling, e-mail, phone book, MMS, check missed calls, caller ID
Personal information: storing information on the user	Security, Cognitive, Expression	Phone book, reminders, call log, organiser
Organisation: synchronizing and making arrangements	Cognitive, Expansion	Phone book, organiser, reminders, check missed calls, calendar, currency converter, vibrating alert, alarm, calculator, stopwatch
Safety and security: making people feel safe and providing security	Safety and security	Caller ID, alarm, car kit, torch
Personal history: creating a personal history	Expression, Esteem	Photo album, MMS, camera, video player, voice recorder
Entertainment: music, jokes, playing games etc.	Cognitive, Aesthetic	Photo album, browse Internet, camera, video capture, video player, Bluetooth, FM radio, profiles, ringtones, voice recorder, MP3/AAC, games, tri/quad band
Expansion: exploring new environments or finding new ways to do things	Expansion, Adventure	No prominent features identified
Non-personal information information on products and services	Cognitive, Exchange	Browse Internet, calendar, Bluetooth, currency converter, calculator, predictive text
Exchange: represented by m-commerce	Exchange	Browse Internet, e-banking
Image (including self-image): enhancing by the appearance, brand, ring tone and accessories	Esteem, Expression, Acceptance	Ringtones

Having established the goodness of fit, we looked towards mapping features onto usage spaces. A cross-tabular frequency table was constructed to find the features associated with each usage space. The results are depicted in Appendix A where each number represents a percentage of the total number of selections made by the participants for the feature-usage space combination. Those above 20% are highlighted as this was used as the cut-off point to associate a feature with a usage space or not. The responses were constrained by the fact that specific features had to be selected from the randomly organised list to make the data capturing manageable, but that does not invalidate the finding that features cluster around usage spaces, which in turn can be related back to motivational human needs.

The features associated with each usage space (according to the 20% metric) are included in the Table 2. Some features are prerequisites for others. For example, a phone book is a prerequisite for using caller identification, speed dialling, etc. Similarly, the messages feature depends on a feature to show the log of messages sent as well as functions for saving and deleting messages. The phone book and the supporting functions relating to a feature are assumed to be prerequisites and are not included for each usage space. The features associated with the personal information usage space was not captured since we observed that apart from some basic common features, such as phone book, reminders, call log and organiser, participants used various approaches to store and secure personal information. Some noted the risk involved in storing personal information on a phone and seemed uncomfortable in divulging this information.

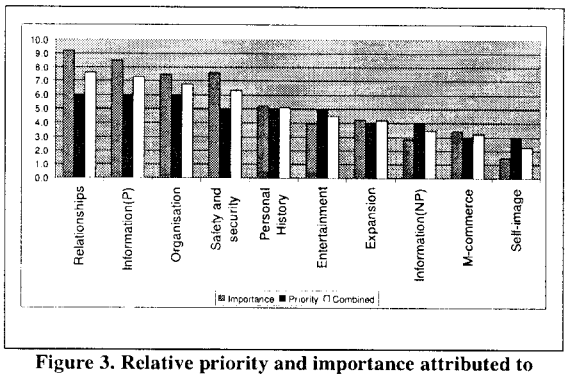

Figure 3. Relative priority and importance attributed to usage spaces

Towards prioritising the usage spaces the survey participants were also required to rate the 'importance' they attributed to each of the 10 usage spaces presented to them, on a 5-point Likert scale ranging from 'very important', to 'totally unimportant'. The 'very important' and 'important' responses were tallied and the average was computed for every usage space in order to give a measure of the 'importance' participants attributed to the space (presented as 'Importance' in Figure 3). The participants were also asked to prioritise the 10 usage spaces (provided in random order) from 1 to 10. The average of this ordering was computed for the whole data set and is depicted as 'Priority' in Figure 3.

To allow for comparison, the average of the values for importance and priority are depicted as 'Combined'. Having captured data on the same concept from two different questions allowed us to triangulate and observe that the first four spaces at the intersection of these two sets are: *relationships*, *personal information*, *organisation*, and *safety and security* a close fourth. The results support the identification of the four core

usage spaces identified in MUSM and our earlier research for this target group of students between the ages of 18 and 30.

Table 2 contains the essence of our study, namely ordering usage spaces from highest priority to lowest, mapping motivational needs to usage spaces (based on earlier work), and then mapping features to usage spaces. These usage spaces are outlined in the first column of Table 2. The second column contains the related motivational human needs and the third column contains the set of features associated with the specific usage space (based on Appendix A).

4.2 Qualitative evaluation

It is essential for the model to be easily understood both by the user (in order to support validation and communication of needs) and the designer (to assist and support them in designing new mobile devices). We performed a small qualitative study using one-to-one interviews with six participants in a range of age groups (two in age group 20-30, two in group 30-40 and two between 40 and 50 years). According to the overall responses MUSM was seen as clear and simple enough to allow comprehension of the usage spaces and yet comprehensive enough to express all the interviewees' mobile phone uses. Participants agreed that the model provides a useful tool to express their mobile phone usage through selecting the appropriate usage spaces and then prioritising the usage spaces. Furthermore, the participants in the age group 20-30 confirmed the four core usage spaces, whilst the older age groups did not see *personal information* as a core usage space.

5. DISCUSSION OF FINDINGS

Considering the results in section 4 we have found evidence for ranking usage spaces for the target group of students between the ages of 18 and 30. The usage space rankings as presented in Figure 3 show some correspondence to the motivational human needs rankings identified by Maslow [24], Herzberg [8] and those identified by The Institute of Management Excellence [31]. The four most important (core) MUSM usage spaces namely, *relationships, personal information, organisation* and *safety and security* correspond to safety and security, belongingness and to some extent the cognitive motivational needs, as identified by Maslow, the hygiene needs identified by Herzberg, and the acceptance, community and security needs, as identified by The Institute of Management Excellence. Although there is no evidence of a definite hierarchy between the usage spaces in MUSM, we did find that there is a set of prerequisite features that is needed to support the usage spaces, and that the features associated with a particular usage space might be required for another usage space. For example, a phone book is a prerequisite for many features in the safety and security, relationships, organisation and personal information spaces. Our research findings therefore support the notion that usage spaces can be divided into core and additional spaces that align with Herzberg's motivator-hygiene theory [8] and The Institute for Management Excellence's primary and secondary needs.

Demographic, social, cultural and personal factors have been found to influence mobile phone user needs [15, 16] and therefore the set of core and additional spaces identified for the demographic group of university students between the ages of 18 and 30 in South Africa, may be different from spaces for other target groups.

Considering the features in Appendix A, it is clear that the *safety and security, organisation, relationships* and *entertainment* usage spaces all have a large number of associated features, as can be expected. But the most fascinating finding is when we analyse the combined set of features associated to the usage spaces (based on the 20% metric) with the highest priorities included in the table, and compare it with the combined sets of features associated with the remaining usage spaces: there is *no overlap* between these sets of features, i.e. they are mutually exclusive.

Relating this to the Kano analysis [12, 13], it means that features related to the highest ranking (core) usage spaces *have* to be present to satisfy basic mobile phone user needs. The features supporting the core uses, present the 'must-haves' identified by Kano, while the additional uses represent the 'more-is-better' and the 'surprise-and-delight' features. If designers and service providers wish to increase mobile phone usage, they should focus first on the 'must-have' features, and not in terms of adding new 'surprise-and-delight' features. It is interesting to note that there are no features linked to the usage space of *expansion* that meets the 20% threshold. This raises a question about the importance of the space, but when we consult Figure 3 we find that the expansion usage is rated more important than *exchange* (m-commerce) or *image*, both of which have been accepted as important mobile phone uses [22]. A possible explanation is that the pre-selected set of 33 features did not contain the features that participants generally associate with the expansion usage space. However, the two highest rated features associated with this space is currency converter and tri/quad band that can both be associated with a typical expansion activity, namely to travel.

The metric of 20% frequency for associating a feature with a usage space was somewhat arbitrary and might require further research to be regarded as an absolute. The Chi-Squared test did, however, provide evidence that there are significant differences in the groupings, and when one analyses the clustering, the 20% threshold seems to be the distinguishing level. The metric also aligns with 80/20 rule used by Kiljander [14].

6. CONCLUSION

This paper focused on the human needs that underlie mobile phone interaction and use, with a specific focus on the relationship between *motivational* human needs and mobile phone use. Furthermore we explored using motivational needs as a point of departure in identifying mobile phone uses and the related features, as alternative to the featuritis approach of starting with a new feature and then finding a use/need for it.

In earlier research we developed MUSM for mapping motivational needs to usage spaces. It distinguishes between features by identifying *necessary (core)* and *extraneous (additional)* usage spaces, which confirms the basic rationale behind the Kano analysis, Herzberg's theory and The Institute of Management Excellence classification. The features associated with the core usage spaces are required so that the mobile phone fulfils basic human needs, whereas the additional features contribute towards the user's level of satisfaction with the device. In this paper we extended the earlier MUSM model

by linking priorities and confirming features associated with the usage spaces.

This research focused on South African based mobile phone users between the ages 18 and 30. Further research is planned to test the model with designers and marketers and also to test the model quantitatively with other demographic groups. The features associated with each usage space will have to be adapted according to new developments and target groups, but we argue that the generic concept of the usage spaces, based on motivational factors, will remain valid. The value of MUSM lies in the fact that mobile phone users can utilize the MUSM usage spaces to express their mobile phone usage needs in non-technical terms, while marketers and designers can use the model to convert the expressed user needs into the supporting features. MUSM therefore links value to the user and feature selection on mobile phones.

To conclude: we have shown that a link might exist between existing mobile phone features and motivational human needs. Designers of new features might, however, also find this useful in determining the impact a new feature could have on the targeted user base. We do not claim that the debate on motivational human needs is over, but our findings go some way to confirm that links may exist between motivational needs, consumer preferences and mobile phone user preferences.

7. ACKNOWLEDGEMENT

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Appendix A – Frequency table for usages spaces vs. features

Usage Spaces Features	Organisation	Entertainment	Relationships	Non-personal Information	Safety & Security	Personal History	Self Image	Expansion	Exchange (M-Commerce
SMS	9.62	7.69	51.92	12.50	9.62	4.81	0.00	2.88	0.96
Calling	13.27	6.12	41.84	17.35	16.33	0.00	2.04	3.06	0.00
Photo Album	10.75	23.66	16.13	8.60	0.00	31.18	6.45	3.23	0.00
Email	12.79	9.30	39.53	15.12	9.30	3.49	0.00	2.33	8.14
Browse Internet	7.06	28.24	4.71	22.35	0.00	0.00	2.35	10.59	24.71
Phone Book	23.81	2.38	30.95	16.67	5.95	13.10	4.76	2.38	0.00
MMS	2.44	13.41	45.12	4.88	0.00	23.17	6.10	3.66	1.22
Camera	5.00	23.75	15.00	2.50	0.00	33.75	12.50	6.25	1.25
Organiser/PIM	41.77	7.59	18.99	18.99	3.80	2.53	3.80	1.27	1.27
Reminders	52.63	2.63	9.21	14.47	9.21	3.95	0.00	6.58	1.32
Video capture	5.26	31.58	14.47	15.79	3.95	19.74	9.21	0.00	0.00
Check Missed Calls	22.67	1.33	33.33	16.00	6.67	18.67	0.00	1.33	0.00
Calender	51.35	0.00	9.46	27.03	1.35	8.11	0.00	2.70	0.00
Video player	2.70	48.65	4.05	9.46	1.35	25.68	6.76	0.00	1.35
Voice dialling	9.59	17.81	15.07	12.33	13.70	6.85	15.07	9.59	0.00
Bluetooth	15.94	26.09	1.45	20.29	1.45	0.00	11.59	13.04	10.14
Caller identity	14.93	0.00	29.85	14.93	32.84	7.46	0.00	0.00	0.00
FM Radio	5.97	65.67	1.49	16.42	0.00	0.00	4.48	4.48	1.49
E-banking	19.35	1.61	3.23	16.13	8.06	0.00	3.23	8.06	40.32
Currency convert	38.33	0.00	1.67	30.00	0.00	0.00	1.67	18.33	10.00
Profiles	18.64	28.81	5.08	10.17	13.56	3.39	16.95	3.39	0.00
Ringtones	6.90	34.48	5.17	5.17	0.00	3.45	43.10	1.72	0.00
Vibrating Alert	33.33	5.26	5.26	10.53	31.58	1.75	7.02	5.26	0.00
Alarm	65.45	0.00	5.45	0.00	25.45	3.64	0.00	0.00	0.00
Voice recorder	10.91	36.36	9.09	7.27	9.09	21.82	1.82	3.64	0.00
Calculator	60.38	0.00	3.77	24.53	1.89	3.77	0.00	1.89	3.77
Car kit	9.43	1.89	0.00	9.43	49.06	5.66	13.21	9.43	1.89
Torch	9.43	7.55	1.89	7.55	67.92	0.00	0.00	5.66	0.00
Stopwatch	46.15	5.77	3.85	15.38	3.85	5.77	3.85	15.38	0.00
MP3/AAC	1.96	70.59	1.96	11.76	0.00	11.76	1.96	0.00	0.00
Games	2.13	85.11	4.26	8.51	0.00	0.00	0.00	0.00	0.00
Tri/Quad band	8.51	31.91	4.26	14.89	2.13	2.13	19.15	17.02	0.00
Predictive Text	17.50	15.00	12.50	25.00	7.50	0.00	15.00	7.50	0.00
Total	432	410	359	315	211	197	134	110	76