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ABSTRACT

With the fourth Industrial Revolution highlighting the increased importance of the service sector, this research sought to understand how mobile apps influence the dynamic capabilities of service sector micro and small enterprises (MSEs) in Lagos, Nigeria. The study analysed data from 388 service sector MSEs in Lagos, using exploratory factor analysis. Five factors were extracted through the maximum likelihood extraction method: mobile app usage, absorptive capability, opportunity-sensing ability, opportunity-shaping ability and opportunity-seizing ability. The resultant model suggests that mobile app usage barely increases the absorptive capability of MSEs; rather, mobile app usage strongly influences the ability to seize opportunities. In addition, absorptive capability has a strong impact on the ability to shape opportunities. The result implies that mobile app usage by service sector MSEs in Lagos deviates from the conventional views on the micro-foundations of the dynamic capability framework, which argues that sensed opportunities are first analysed (shaped) before deploying resources towards their maximisation. These findings suggest that the service sector MSEs in Lagos seldom scrutinise opportunities before deploying resources to seize them. This study contributes to information system (IS) knowledge by revealing a contextual model for investigating the use of mobile apps in service sector MSEs. It also extends IS literature on how mobile apps help MSEs to exploit business opportunities in Lagos, Nigeria. These findings can probably be generalised to other developing countries.

Keywords: Mobile apps; Dynamic capability; Service sector micro and small enterprises; Exploratory factor analysis (EFA)

1. INTRODUCTION

The driver of economic growth has evolved from mechanisation in the first Industrial Revolution to integrated solutions in today's fourth Industrial Revolution (Kazancoglu & Ozkan-Ozen 2018), where technology permeates societies and personalities. The fourth Industrial Revolution features technologies that speak to physical, digital and biological worlds, prompting disruptions across disciplines, industries and economies (Schwab 2017; Ferrari 2017). For instance, services offered by cabs, hotels, grocery stores, banks, schools and

hospitals are now personalised offerings available via a smartphone as mobile apps, thus redefining service offerings.

The fourth Industrial Revolution projects the service sector as a wealth creator and economic stimulant (Morrar, Arman & Mousa 2017; Schwab 2017). The service sector accounts for a high proportion of employment, and is the biggest driver of the gross domestic product (GDP) in developing nations (Ehigiator 2017; Wamboye & Nyaronga 2018). This is arguably true for Africa, which has seen an increased adoption of mobile technologies, internet penetration, unemployment, poverty and failed small businesses in recent years. Nonetheless, there has been little research revealing the potential of small businesses in the service sector and the implications of mobile technologies, such as mobile apps. These mobile apps give micro and small enterprises (MSEs) in the service sector (SS-MSEs) easy access to information systems (IS) with benefits of building unique competencies in a fast-paced environment (Khanna, Papadavid, Tyson & Willem te Velde 2016; Wu 2014). The dynamic capability (DC) framework could explain how SS-MSEs integrate, build and reconfigure internal and external competencies to maximise opportunities in rapidly changing environments (Wang & Shi 2011; Wang & Ahmed 2007; Teece 2007). Therefore, the DC framework is a preferred theoretic lens to investigate how MSEs manage changes influenced by the fourth Industrial Revolution.

This exploratory research sought to provide clarity on *how* mobile apps can influence the DCs of SS-MSEs in developing economies. Using Lagos, Nigeria as a case study, the study explored *how* opportunities offered by increased mobile app usage can mitigate the threats of unemployment and poverty in the context of developing countries. The remainder of this article presents a review of literature, the quantitative research approach, the research findings and the implications.

2. RESEARCH OBJECTIVE

The objective of this study was to answer the research question:

> *How do service sector micro and small enterprises in Lagos use mobile apps to sense, shape and seize opportunities from a dynamic capability viewpoint?*

3. LITERATURE REVIEW

This section presents existing literature, thus building on the findings of previous studies.

3.1 Micro and small enterprises (MSEs) in Nigerian service sector

The Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) defines MSEs as lawful businesses whose total assets cap at 50 million Naira (138 000 USD) with 1 to 49 employees (SMEDAN & NBS 2013). If a business falls short in one of the defining criteria (assets and employees), the number of employees takes precedence. MSEs stimulate economic growth, create jobs and reduce poverty (Calli & Clark 2015). In Nigeria, MSEs employ over 70% of the total labour force and contribute about 48% to the GDP (Ayanda & Adeyemi 2011). Nevertheless, the dynamic nature of MSEs makes them vulnerable to failure because of unexpected changes in economic policies, technology and global trends. Beside the unplanned

changes, MSEs also risk failure within the first 5 years because of poor management skills of the owner, lack of infrastructure and low financial support (Eniola, Entebang & Sakariyau 2015; Osotimehin, Jegede, Akinlabi & Olajide 2012).

The service sector of an economy refers to all businesses excluding those involved in manufacturing and agriculture (Andrew, Adedayo & Addedayo 2018; Davis 2017); therefore the service sector includes healthcare, entertainment, financial services, hospitality, sport, information communication technologies, education, personal services, etc. About 73% of Nigerian MSEs are found in the service sector. This sector accounted for 54.8% of Nigeria's rebased GDP in 2014, which is a departure from the tradition of oil and gas production contributing 40%. The evolving Nigerian economy has been influenced by emerging industries such as Nollywood and home-grown e-commerce (Jumia and Konga). The above suggests that 70% of SS-MSEs engage over 70% of the Nigerian labour force (SMEDAN & NBS 2013; PwC 2015). Consequently, the potential contribution of SS-MSEs to the overall well-being of a developing country such as Nigeria makes this study very relevant.

3.2 Dynamic capabilities of MSEs

The DC framework explains how MSEs build, integrate and reconfigure internal and external competencies to maximise opportunities in rapidly changing environments (Wang & Shi 2011; Wang & Ahmed 2007; Teece 2007). It explains the reality which makes two businesses with the same measure of resources produce different outputs in the same business environment. DCs are unique strengths built by businesses over time (Kuria & Kitenga 2014). Absorptive, adaptive and innovative capabilities are dimensions of DC. Absorptive capability helps businesses to extract external information, assimilate it and use it to create and/or maximise opportunities (William, Vinit & Patel 2013). Adaptive capability in MSEs is the capacity to quickly identify and use external opportunities by adapting their practices in response to environmental changes (Wang & Ahmed 2007), while innovative capability is demonstrated through creativity at birthing new business ideas through the creation of new products, services, markets or business models (Grimaldi, Quinto & Rippa 2013).

Previous research suggests that MSEs in Lagos demonstrate absorptive capability through collaboration with stakeholders and information analysis. MSEs manifest adaptive capability through feedback and referrals, social media and advertisement. Innovative capability is revealed through imitation and adaptation of offerings as well as the adjustment of packaging and pricing (Owoseni & Twinomurinzi 2017).

Furthermore, DCs can be explained from an opportunity maximisation perspective as that which requires the capability to sense, shape and seize opportunities. Opportunity sensing is an entrepreneurial skill set which involves probing the market, engaging the customers and scanning the business value change or ecosystem. Opportunity shaping is an analytical skilfulness that helps aligns sensed opportunities with business objectives. Opportunity seizing deals with activities that deploy resources toward opportunities and derive value (Wagner & Wagner 2013). This approach demonstrates how opportunities are identified and assessed and

resources mobilised to capture benefits of the opportunities. Effective mobilisation of resources leads to business transformations, helping the business to remain competitive and profitable (Sharma & Shanks 2011). These activities are required if MSEs must sustain themselves as economies and technologies evolve.

3.3 Mobile app usage in MSEs

The fourth Industrial Revolution is changing how MSEs compete for shares and advantages in the open, virtual and borderless markets (Islam, Khan, Obaidullah & Alam 2011). According to Davis (2017), effects of this revolution manifest in customer expectations, product enrichment and collaborative innovation. Customers are increasingly becoming the centre of attention, which is about improving how customers are served. Physical products and services can now be enhanced with digital capabilities that increase their value using emerging technologies such as the Internet of Things, block chains and robotics automation, which could be presented to end-users as mobile apps. The strategic use of mobile apps, as ICT, could maximise the benefits of information (Didi-quvane & Twinomurinzi 2013).

It has been proven that MSEs which recognise and employ the strategic use of ICT tend to be more productive and profitable because they benefit from the increased efficiency offered by data-driven technologies (Goldkuhl 2004). A study conducted in Lagos, Nigeria revealed that the use of a customised mobile app for MSEs in the laundry business led to an increase in both revenue and the number of employees after 6 months (Owoseni & Twinomurinzi 2018). These laundry businesses used mobile apps to streamline their business processes, which included job ordering, job delivery, customer relationship management and payments. MSEs in Nigeria use a variety of mobile apps. The MSEs mainly use social media apps for business communication and marketing, mobile banking apps for payments and travel/transport apps for delivery of products/services.

The use of appropriate technologies such as mobile apps can lower entry barriers for emerging MSEs and thus allow favourable competition by creating online marketplaces and tools which facilitate customer engagement and sales (Gierten & Spiezia 2016). There is the perception that Nigerian MSEs use mobile apps; it is, however, insufficient to only use apps without an understanding of how to gain the maximum benefits from their use, especially in a dynamic economic environment. This study sought to understand how MSEs in Lagos, Nigeria use mobile apps to enhance their businesses in a dynamic economic environment.

4. RESEARCH APPROACH

This study used a quantitative research approach. The exploratory nature of this research, which sought to understand how SS-MSEs develop DC with mobile apps, was done within the scope of exploratory factor analysis (EFA). EFA is a quantitative approach that reveals the underlying structure or relationship between large collections of measured variables whose interaction is unclear (Fabrigar & Duane 2011). It reveals the underlying structure by extracting latent constructs from measured variables. Thus, this study used EFA to reduce a large number of measured variables (on *how* MSEs use mobile apps) into smaller sets of latent

constructs (factors) and established underlying relationships between them (Neill 2008). Consequently, EFA outputs provide clarity on *how* constructs interact in the real-life context of MSEs.

4.1 Data Sampling

The research sample size was drawn from owners and/or managers of SS-MSEs in Lagos, Nigeria using non-probability sampling. This sampling technique offers the researcher freedom to select a sample size based on personal judgement. It is cost and time effective, more so in a research context where detailed information about the research population is elusive, such as Lagos. 500 SS-MSEs were identified based on details retrieved from an online business directory. The sample size of 500 satisfied the general guidelines for data adequacy in EFA, which starts from 300 (Bartlett, Kotrlik & Higgins 2001; Yong & Pearce 2013). The study focused on Lagos as the case study because it was more convenient to access MSEs in Lagos.

4.2 Data Collection

The study retrieved data by means of a questionnaire. The first section of the questionnaire captured the type of business and employee count. The second section consisted of 35 5-point Likert scale questions, which captured 35 measured variables (see Appendix 1). The measured variables align with mobile app usage and DC constructs. The questionnaire was converted to an online survey using Google forms. A face-to-face survey was carried out by 12 data collection field officers, who were hired, trained and given customised T-shirts and nametags. A face-to-face survey was chosen to increase the survey response rate and collect high quality data from the respondents during the field exercise. Responses were entered directly on Google forms through smart handheld devices.

4.3 Data Screening

The data collection exercise produced 388 responses. The responses were checked for completeness, and all 388 records passed the check. This was to be expected because the data entry fields in Google forms validated data inputs. Thereafter, the responses were screened as follows using SPSS 25:

- ***Screen for unengaged responses:*** Unengaged responses were identified through the standard deviation (SD) of each response. Any response whose SD was less than 0.2 was not engaging (Taherdoost, Sahibuddin & Jalaliyoon 2004), suggesting that participants selected the same options for all 35 measured variables. A total of 46 responses were found to be unengaged. The removal of unengaged responses reduced the feedback to 342 responses.
- ***Screen for outliers:*** Outliers are data points with extreme values in measured variables. There were no univariate outliers based on the outcome of the descriptive statistics (variance) of 342 responses.
- ***Screen for normal distribution:*** Normal distribution screening was carried out through kurtosis and skewness, and all measured variables had an acceptable normal distribution (-2 to +2). (See Appendix 2.)

- ***Screen for sampling adequacy:*** Sampling adequacy provides the researcher with information regarding the grouping of survey items prior to actual EFA. In this regard, the outcome of Kaiser-Meyer-Olkin (KMO) and Bartlett's test was very satisfactory with the KMO measure of sampling adequacy at .917 (Samuels 2017). Table 1 presents the KMO and Bartlett's test results.

Table 1: KMO and Bartlett's Test

KMO and Bartlett's test		
KMO measure of sampling adequacy		.917
Bartlett's test of sphericity	Approx. chi square	7520.201
	Df	528
	Sig.	.000

4.4 Data Analysis: EFA

Following a satisfactory outcome of data screening, 35 measured variables were examined using SPSS 25. The first run of EFA using the maximum likelihood extraction method showed that the extraction coefficient of two measured variables (ABC2 and ABC5) was less than 0.2 as outlined in the communalities report (see Appendix 4). Therefore, variables ABC2 and ABC5 were removed and the data was re-examined using the same extraction method. This time, five factors were extracted because the percentage variance of the initial eigenvalues of these factors was greater than 1.0 (see Appendices 5 and 6). The extracted factors are also reflected in the scree plot shown in Figure 1.0.

Afterwards, the Cronbach's alpha values for the extracted variables were calculated to ensure the reliability of extracted factors. Cronbach's alpha was within the acceptable range of 0.7 to 0.99 (Taber 2016). (See Appendix 6.)

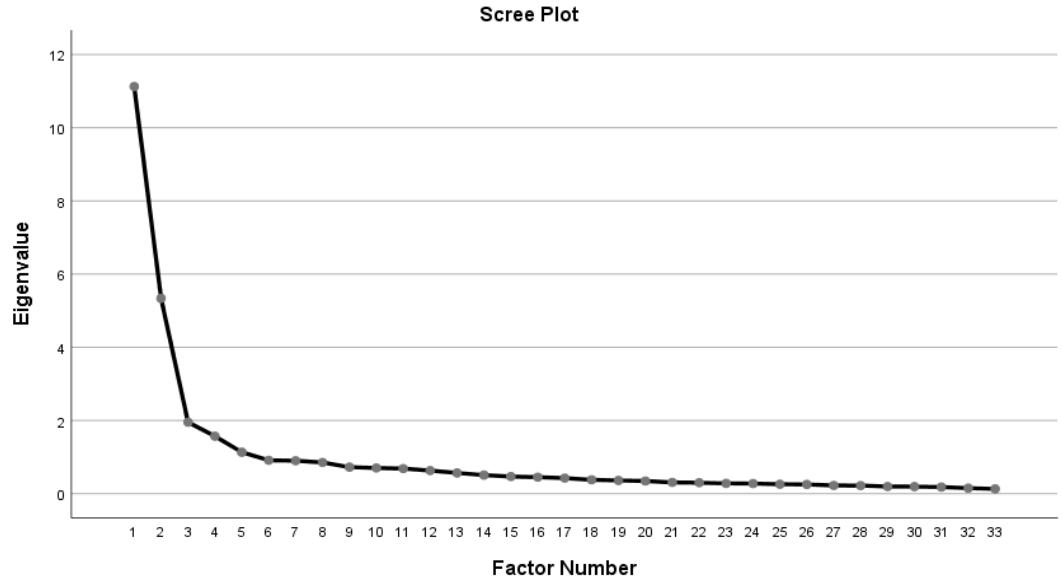

Figure 1: Scree Plot

4.5 Results

The demographics of the respondents showed that data was collected from 19 distinct business types in SS-MSEs. The top three businesses were grocery/retail sales, laundry/cleaning services and makeup/hairstyle services, at 12.8%, 11.7% and 10.2%, respectively. Financial services, dispatch/delivery services and security services had low frequencies of 0.6, 1.2 and 1.5, respectively. (See Appendix 3.)

Against the backdrop of EFA, the five extracted factors which represent latent variables are:

1. Mobile app usage
2. Absorptive capability
3. Opportunity-sensing ability
4. Opportunity-shaping ability
5. Opportunity-seizing ability

Subsequently, the factor correlation matrix through correlation coefficients explains the relationships between the factors as presented in Table 2. Promax was used with Kaiser normalisation as the rotation method and the maximum likelihood extraction method. The correlation coefficients of 0.20 - 0.29, 0.30 – 0.39, 0.40 – 0.69 and 0.70 – 0.99 depict weak, moderate, strong and very strong relationships, respectively (Yong & Pearce 2013; Hurley, Scandura, Schriesheim, Brannick, Seers, Vandenberge & Williams 1997). The factor correlation matrix was transformed into a contextual model, which represents the associations between the five extracted factors. The factor loadings were included in the model (see Appendix 7 and Figure 2).

Table 2: Factor Correlation Matrix

Factor correlation matrix					
Factor	1	2	3	4	5
1	1.000				
2	.318	1.000			
3	.241	.169	1.000		
4	.306	.537	.111	1.000	
5	.400	.111	-.412	.172	1.000

Extraction method: Maximum likelihood
Rotation method: Promax with Kaiser Normalisation

Extracted factors

1. Mobile app usage
2. Absorptive capability
3. Opportunity-sensing ability
4. Opportunity-shaping ability
5. Opportunity-seizing ability

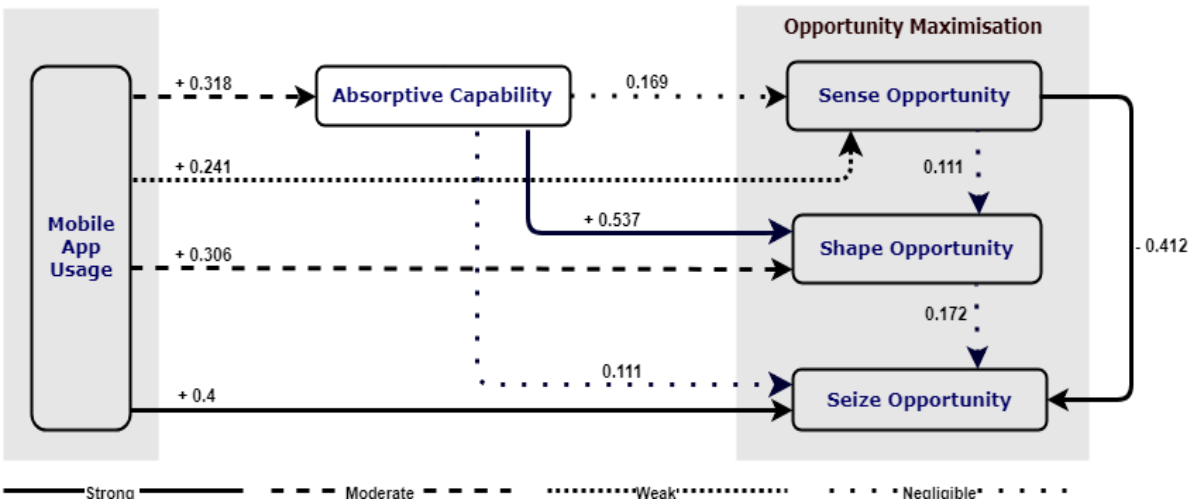

Figure 2: Contextual model of mobile app usage by service SMEs in Lagos, Nigeria

Thus far, the contextual model summarised *how* SS-MSEs in Lagos use mobile apps to maximise opportunities, drawing from the factor loading in the model. Mobile app usage had strong factorability (+.40) with opportunity-seizing ability. Mobile app usage moderately influenced absorptive capability and opportunity-sensing capability with factor loadings of +0.318 and +0.306, respectively. Mobile app usage had a weak influence on opportunity-sensing ability. The strongest influence in the model is on absorptive capability and opportunity-shaping ability, with a factor loading of +0.537. In addition, the model shows an inversely strong relationship between opportunity-sensing and opportunity-seizing abilities with a factor loading of –0.412. No significant associations were found between the following pairs of latent variables: absorptive capability and sensing opportunity, absorptive capability and seizing opportunity, sensing opportunity and shaping opportunity, shaping opportunity and seizing opportunity.

5. DISCUSSION OF FINDINGS

This section reflects on the research outcome, its implications and contributions to the field of IS.

5.1 Implications of findings

The research findings identify three areas worthy of attention.

Firstly, the findings suggest that SS-MSEs in Lagos barely use mobile apps to *extract* external information for making informed decisions (absorptive capability). Rather, they use mobile apps for *executing* opportunities (refer to Figure 2 showing the relationships between mobile app usage and absorptive capability, and mobile app usage and seizing opportunities). Thus, the capabilities of mobile apps to extract opportunities are insufficiently exploited. For example, the usage of social media mobile apps by SS-MSEs is limited to advertisements and collaboration, whereas social media has more intelligent capability to analyse user posts (texts, emotion-icons, likes, locations, pictures, videos, etc.), and anticipate services that users are inclined to buy. This limited use of intelligent mobile apps arguably results from knowledge

gaps or the relatively high cost of acquisition/usage. The limitation presents opportunities to create contextually relevant apps for MSEs. Generally MSEs simply adopt mobile apps that are freely available.

Secondly, the results imply that mobile app usage by SS-MSEs in Lagos deviates from the conventional views on DC micro-foundations where sensed opportunities are first analysed (shaped) before deploying resources towards their maximisation (Niehaves, Plattfaut & Sarker 2011) (refer to Figure 2 showing the relationships between sensing, shaping and seizing opportunities). The results suggest that MSEs in Lagos seldom scrutinise opportunities before deploying resources. Arbitrary disbursement of resources (which are usually lean) could hamper business growth and profitability. For example, a potential request for a product or service by a customer who engaged with the business on social media does not make the request profitable. The customer location and cost of delivering the requested services to the customer should be a consideration.

Lastly, the findings imply that enhancing absorptive capabilities of MSEs in Lagos results in the increased ability to shape opportunities (refer to Figure 2 showing the relationship between absorptive capability and shaping opportunities). This means that activities that increase stakeholders' collaboration and information analysis in SS-MSEs will also improve the MSEs' capacity for shaping opportunities and possibly seizing more opportunities.

5.2 Contributions of study

This study contributes to the field of IS by revealing a contextual model that demonstrates *how* SS-MSEs in Lagos use mobile apps. The model can be adapted to investigate the use of other IS artefacts in another context through definitive quantitative methods such as confirmatory factor analysis and structural equation modelling. Also, the research expands the literature and provides clarity on *how* mobile apps help SS-MSEs exploit business opportunities in Lagos, Nigeria, which could be relevant to other developing countries.

5.3 Limitations of study and future research

This study was limited because it focused on SS-MSEs in Lagos, Nigeria. The data captured from Lagos may not sufficiently reflect the experience of MSEs in other Nigerian cities. Moreover, this research did not consider important demographic variables (i.e. age, educational background, size of business and age of business) of MSE owners/managers, which could further enhance the outcome of this research.
Additionally, survey respondents were sceptical about the intent of the study; there was the incorrect perception that the study was sponsored by government for tax re-evaluation; as such, some MSEs solicited monetary rewards for participating in the study. This could be attributed to the cultural mindset.

Future research can bridge the gaps identified by these limitations, by extending the study to non-service sector business organisations, selecting a wider sample size and pre-empting the cultural mindset of target respondents.

6. SUMMARY AND CONCLUSION

Motivated by the effects of the fourth Industrial Revolution on the service sector, this study set out to gain an understanding of *how* mobile apps influence the DCs of SS-MSEs in Lagos, Nigeria. The researchers collected data from 388 SS-MSEs and analysed the data using EFA. The analysis extracted five factors (latent variables): mobile app usage, absorptive capability, opportunity-sensing ability, opportunity-shaping ability and opportunity-seizing ability. The relationships between the factors were identified through correlation coefficients. Subsequently, a resultant contextual model clarified the associations between the factors.

The results suggest that SS-MSEs in Lagos scarcely use mobile apps to *enhance* absorptive capabilities. However, they do use mobile apps to *seize* opportunities. In addition to this, mobile app usage by SS-MSEs deviates from the traditional knowledge of DC micro-foundations, where *sensed* opportunities are first *shaped* before they are *seized*. The research outcomes suggest that SS-MSEs in Lagos deploy resources to *seize* opportunities without *shaping* the *sensed* opportunities. Developing the absorptive capabilities of MSEs in Lagos could result in an increased ability to shape opportunities.

The above indicates that products and services offered by SS-MSEs in Lagos can be enhanced with digital capabilities that increase their value through emerging technologies such as the Internet of Things, block chain and artificial intelligence (AI). For example, through text analysis and language understanding AI could detect the intent of a potential customer towards service offerings while interacting with the customer via voice or text (Microsoft 2018), thus enhancing the SS-MSEs' ability to maximise opportunities. This is an opportunity for mobile app developers. In this way, the service sector can contribute more to the Nigerian economy (as well as that of similar developing countries) through job creation and poverty alleviation when opportunities are intelligently utilised.

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APPENDIX 1

Measured variable mapping

Measured Variables	Mapping
Mobile app usage	
We use mobile apps to provide feedback to customers.	MUSAGE1
We use mobile apps to get referrals	MUSAGE2
We use mobile apps to chat or text.	MUSAGE3
We use mobile apps to store contacts, document or recorded conversation.	MUSAGE4
We use mobile apps for virtual meetings.	MUSAGE5
We use mobile apps for advertisement and marketing.	MUSAGE6
We use mobile apps to organise and plan our schedules (reminders)	MUSAGE7
We use mobile apps to search the internet for get desired information	MUSAGE8
We use mobile apps for analysing information.	MUSAGE9
We use mobile apps for accounting and book/keeping	MUSAGE10
We use mobile app to sell our products and services.	MUSAGE11
We use mobile apps for payments and collections	MUSAGE12
We use mobile apps for learning	MUSAGE13
We use mobile apps for managing job orders	MUSAGE14
We use mobile apps to create online content like blogs/news/articles	MUSAGE15
Seizing Opportunity	
We prevent threats through usage of mobile apps.	SEIZE1
We deploy (position) resources through mobile apps usage	SEIZE2
Using mobile apps helps us to block loop holes in business	SEIZE3
Using mobile apps helps use to reduce risks	SEIZE4
Using mobile apps helps use to speedily implement our ideas	SEIZE5
Shaping Opportunity	
We analyse threats while using mobile apps	SHAPE1
We analyse opportunities through while using mobile apps	SHAPE2
Through the mobile apps, we identify risks associated with opportunities	SHAPE3
Through the use of mobile apps, we understand opportunities better	SHAPE4
Mobile apps help us to separate profitable business opportunities from unprofitable ones	SHAPE5
Sensing Opportunity	
Through the use of mobile apps, we foresee opportunities	SENSE1
Mobile apps help use to identify opportunities	SENSE2
We become conscious of opportunities through mobile apps	SENSE3
We create opportunities by using mobile apps	SENSE4
We discover hidden opportunities when we use mobile apps	SENSE5
Absorptive Capability	
We easily change the packaging and pricing of our offering with mobile apps	ABC5
Through mobile apps usage, we identify sales opportunities	ABC4
Information become clearer when we use mobile apps	ABC3
We easily change the packaging and pricing of our offering with mobile apps	ABC2
We use mobile apps to make our offering suitable to specific customer or situation	ABC1

APPENDIX 2

Descriptive statistics of 35 measured variables

Measured Variables	N	Std. Deviation	Variance	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
ABC1	342	1.205	1.452	-1.304	.132	.592	.263
ABC2	342	1.305	1.704	-1.156	.132	.082	.263
ABC3	342	1.185	1.404	-1.228	.132	.639	.263
ABC4	342	1.205	1.452	-1.026	.132	.041	.263
ABC5	342	1.492	2.227	-.936	.132	-.673	.263
SENSE1	342	1.041	1.083	-.920	.132	.084	.263
SENSE2	342	1.005	1.009	-1.098	.132	.272	.263
SENSE3	342	1.034	1.069	-1.329	.132	.841	.263
SENSE4	342	1.390	1.931	-.596	.132	-.961	.263
SENSE5	342	1.405	1.974	-.267	.132	-1.240	.263
SHAPE1	342	1.157	1.340	-1.148	.132	.439	.263
SHAPE2	342	1.110	1.232	-1.102	.132	.368	.263
SHAPE3	342	1.123	1.261	-.947	.132	-.083	.263
SHAPE4	342	1.248	1.556	-.796	.132	-.519	.263
SHAPE5	342	1.353	1.830	-.612	.132	-.935	.263
SEIZE1	342	1.118	1.250	-1.216	.132	.561	.263
SEIZE2	342	1.197	1.433	-.619	.132	-.618	.263
SEIZE3	342	1.270	1.613	-.750	.132	-.536	.263
SEIZE4	342	1.098	1.206	-1.212	.132	.392	.263
SEIZE5	342	1.219	1.485	-.863	.132	-.286	.263
MUSAGE1	342	1.413	1.996	-.815	.132	-.690	.263
MUSAGE2	342	1.418	2.010	-1.037	.132	-.336	.263
MUSAGE3	342	1.329	1.766	-1.562	.132	1.020	.263
MUSAGE4	342	1.485	2.205	-.860	.132	-.795	.263
MUSAGE5	342	1.481	2.193	.478	.132	-1.165	.263
MUSAGE6	342	1.595	2.544	-.436	.132	-1.396	.263
MUSAGE7	342	1.573	2.476	.159	.132	-1.522	.263
MUSAGE8	342	1.513	2.288	-.815	.132	-.882	.263
MUSAGE9	342	1.554	2.414	-.383	.132	-1.385	.263
MUSAGE10	342	1.594	2.540	.366	.132	-1.430	.263
MUSAGE11	342	1.588	2.521	-.423	.132	-1.397	.263
MUSAGE12	342	1.563	2.443	-.478	.132	-1.304	.263
MUSAGE13	342	1.543	2.380	-.376	.132	-1.368	.263
MUSAGE14	342	1.568	2.459	-.380	.132	-1.381	.263
MUSAGE15	342	1.711	2.929	.264	.132	-1.642	.263

APPENDIX 3

Sample size: analysis of SS-MSEs

S/No.	Business Type	Frequency	Per cent (%)	Average No. of Employees
1	Rental services	15	4.39	6
2	Laundry and cleaning services	40	11.70	7
3	Entertainment	19	5.56	4
4	Consulting services	6	1.75	4
5	Childcare services	18	5.26	8
6	Makeup artist and hairstyling services	35	10.23	5
7	Food/confectionaries/catering services	25	7.31	4
8	Dispatch/delivery services	4	1.17	6
9	Plumbing/repair services	14	4.09	3
10	Transportation services	12	3.51	3
11	IT/computer or smartphone repair services	13	3.80	5
12	Financial services	2	0.58	8
13	Telecom support/accessory/sales services	23	6.73	3
14	Vehicle repair services	18	5.26	6
15	Shoe repair services	6	1.75	2
16	Tailoring services	22	6.43	4
17	Security services	5	1.46	5
18	Electronics repair services	23	6.73	4
19	Grocery/retail sales	42	12.28	6
	Total	**342**	**100**	**5**

APPENDIX 4

Communalities report

Communalities		
	Initial	Extraction
ABC1	.378	.215
ABC3	.442	.282
ABC4	.456	.311
SENSE1	.592	.596
SENSE2	.669	.703
SENSE3	.629	.622
SENSE4	.589	.439
SENSE5	.598	.469
SHAPE1	.441	.351
SHAPE2	.609	.560
SHAPE3	.683	.646
SHAPE4	.723	.612
SHAPE5	.737	.614
SEIZE1	.632	.598
SEIZE2	.663	.653
SEIZE3	.652	.595
SEIZE4	.616	.561
SEIZE5	.736	.764
MUSAGE1	.712	.713
MUSAGE2	.754	.849
MUSAGE3	.639	.557
MUSAGE4	.624	.607
MUSAGE5	.626	.624
MUSAGE6	.677	.655
MUSAGE7	.657	.697
MUSAGE8	.677	.621
MUSAGE9	.713	.706
MUSAGE10	.357	.289
MUSAGE11	.712	.716
MUSAGE12	.551	.520
MUSAGE13	.593	.559
MUSAGE14	.615	.534
MUSAGE15	.557	.536
Extraction method: Maximum likelihood		

APPENDIX 5

Factor extraction report

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings a
	Total	% of Variance	Cumm %	Total	% of Variance	Cumm %	Total
1	11.125	33.713	33.713	10.642	32.250	32.250	7.325
2	5.337	16.173	49.885	4.976	15.079	47.329	4.383
3	1.953	5.918	55.804	1.452	4.399	51.728	5.140
4	1.571	4.759	60.563	1.156	3.503	55.231	4.671
5	1.132	3.432	63.995	.550	1.666	56.896	8.169
6	.912	2.764	66.759				
7	.900	2.728	69.487				
8	.853	2.586	72.073				
9	.726	2.198	74.271				
10	.703	2.129	76.400				
11	.685	2.075	78.475				
12	.630	1.909	80.384				
13	.567	1.717	82.101				
14	.508	1.539	83.640				
15	.468	1.418	85.057				
16	.451	1.367	86.425				
17	.425	1.287	87.712				
18	.379	1.149	88.861				
19	.361	1.093	89.954				
20	.345	1.045	90.999				
21	.308	.933	91.932				
22	.299	.906	92.838				
23	.282	.853	93.691				
24	.277	.840	94.530				
25	.257	.778	95.309				
26	.252	.763	96.072				
27	.224	.680	96.752				
28	.221	.670	97.422				
29	.196	.594	98.015				
30	.193	.585	98.600				
31	.181	.547	99.147				
32	.151	.457	99.604				
33	.131	.396	100.000				

Extraction method: Maximum likelihood

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

APPENDIX 6

Pattern matrix report

Pattern Matrix					
	Factor				
	1	2	3	4	5
Cronbach's Alpha (Reliability)	0.929	0.688	0.788	0.873	0.899
ABC1		.615			
ABC3		.508			.
ABC4		.583			
SENSE1			.411		
SENSE2			.634		
SENSE3			.635		
SENSE4			.494		
SENSE5			.634		
SHAPE1				.533	
SHAPE2				.774	
SHAPE3				.797	
SHAPE4				.639	
SHAPE5				.559	
SEIZE1					.870
SEIZE2					.764
SEIZE3					.724
SEIZE4					.726
SEIZE5					.795
MUSAGE1	.718				
MUSAGE2	.777				
MUSAGE3	.804				
MUSAGE4	.366				
MUSAGE5	.670				
MUSAGE6	.683				
MUSAGE7	.719				
MUSAGE8	.771				
MUSAGE9	.732				
MUSAGE10	.399				
MUSAGE11	.866				
MUSAGE12	.704				
MUSAGE13	.651				
MUSAGE14	.700				
MUSAGE15	.522				
Extraction method: Maximum likelihood Rotation method: Promax with Kaiser normalisation.a a. Rotation converged in 6 iterations					

APPENDIX 7

Associations between extracted factors

S/No.	Related Latent Variables (Factors)	Relationship	Correlation Coefficient	Interpretation
1	Mobile app usage and absorptive capability	1 <> 2	.318	Moderate positive relationship
2	Mobile app usage and sensing opportunities	1 <> 3	.241	weak positive relationship
3	Mobile app usage and shaping opportunities	1 <> 4	.306	Moderate positive relationship
4	Mobile app usage and seizing opportunities	1 <> 5	.400	Strong positive relationship
5	Absorptive capabilities and sensing opportunities	2 <> 3	.169	No or negligible relationship
6	Absorptive capabilities and shaping opportunities	2 <> 4	.537	Strong positive relationship
7	Absorptive capabilities and seizing opportunities	2 <> 5	.111	No or negligible relationship
8	Sensing opportunities and shaping opportunities	3 <> 4	.111	No or negligible relationship
9	Sensing opportunities and seizing opportunities	3 <> 5	-.412	Strong negative relationship
10	Shaping opportunities and seizing opportunities	4 <> 5	.172	No or negligible relationship