An Analysis of Temporal Nature of Urban Activities in Ilorin, Nigeria

By Adedokun Olutoyin Moses (Ph.D)

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Strictly as per the compliance and regulations of:

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I. Introduction

The study of the interaction between population, activities and times is a complex one with many dimensions. These dimensions include the location, timing, duration, sequence and type of activities and or trips. These characteristics of space-time behaviour have made the simultaneous analysis of its many dimensions imperative (Kwan, 2002, 2003). Although geographers view places in a two dimensional ways: space and time or spatio-temporal, they often tend to ignore the time element. Previous researches have either focused on spatial dimensions (Main, 1982) or have completely ignored time element as if it is not important. This paper, thus, discusses the temporal nature of activities, that is, the degree of spatial fixity of each activity and its implication on urban infrastructural planning.

The approach of integrating individual spatial behaviour overtime was pioneered by Hãggertrand (1969). He used a simple diagram to illustrate his concept of space-time dimensions (Figure 1) Hãggertrand postulated the geographers' two-dimensional space on the surface of the earth or on the surface of a map. A line on this surface indicated movement in space but not in time. He suggested a third dimension to signify time.

Figure1 represents a very simple working day. Solid lines represent the path of all obligatory activities and dotted lines the prism or feasible regions of movement in periods for which there are no fixed activities. The worker is assumed to be effectively fixed at home until 7:30am to 8:00am where he can conveniently sleep and take breakfast. He must then take a direct route to work, where he is obliged to stay until lunchtime. During the lunch hour he has a certain amount of freedom; he must be back in the office exactly an hour. From 2pm until about 5pm he is again expected to stay at work. But after 5pm he has no need to be home until 7pm for supper. In this period, 5-7pm, he can stay on at work or he can go somewhere near or stop off on the way back for a drink or visit. The main feature implicit in this model of daily behaviour is the idea that certain activities are fixed in both space and time.

II. Methodology

a) Source of Data

The Activity Network Approach (ANA) was adopted for this study. ANA is a micro-behavioural, inductive approach that makes 'predictions about the whole from disaggregate data of the behaviour of individuals using Time Budget Diary (TBD). TBD questionnaire focuses on the socio-economic attributes of the individual, types of activities, location of activities, beginning and end time of activities, number of participants in each activity, extent to which each activity was arranged and whether an individual could have done:
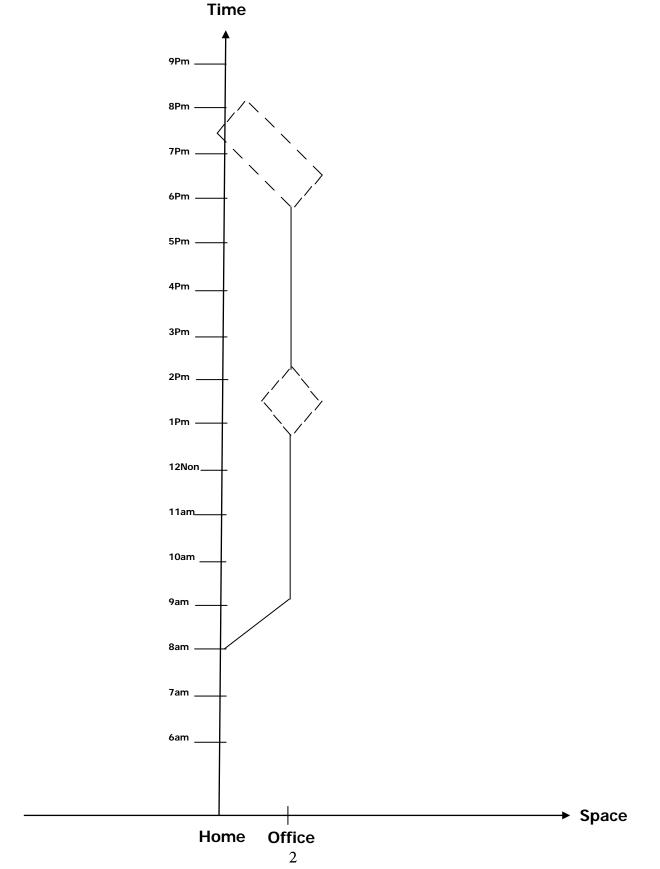
- anything else at the time of this activity,
- this activity at any other time,
- this activity elsewhere, and whether,
- been anywhere else at the time of his activity is taking place.

b) Sampling Procedure

The 20 electoral wards in Ilorin formed the spatial framework for primary data collection. The use of these wards was based on the fact that it makes it easier to obtain data on population. The sample size was 500 literate individuals. This number was proportionally distributed among the 20 wards based on their 1991 population projected to 2006, using 3.5 percent annual growth rate. Number of respondents to be interviewed from each ward was randomly selected. This sample is considered adequate for the study of this

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Figure 1 : Man's daily space-time dimensions.

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Source : Adapted from Haggerstrand (1969).

nature because of the complexity of completing the questionnaire, the time and cost involved in administering the questionnaire, monitoring the respondents, and more importantly, because researches involving Time Budget Diary do not normally accommodate large samples (Timmermanns, 2000; Kwan, 2005). Each respondent was issued seven copies of the TBD questionnaire, one for each day of the week. Research assistants monitored the respondents at home and work places.

c) Method of Data analysis

The following methods were use to analyse the data: (i) descriptive statistics and tables to summarise the data; (ii) Stepwise regression analysis to determine the temporal fixity of the respondents.

III. THE STUDY AREA

When the present city of Ilorin was founded is not very clear. Indeed, little is known about its pre-jihad political development. Ilorin is today the capital of Kwara State. It is located on latitude 80.30N and Longitude 40.35'E. It lies on the southern fringes of the savanna region and north of the forest zone. Ilorin is located in the Guinea savanna grassland belt of middle belt region of Nigeria. The main river in Ilorin is the Asa which flows in the south-north direction. It divides Ilorin into two parts: a western part representing the core or indigenous area and the eastern part where the Government Reservation Area (GRA) is located. (Oloru, 1998)

Ilorin has experienced a rapid growth in its population over the years. The first population census in 1911 put the population of Ilorin at 36,343 while the 1953 population census put the town's population at 40,994. The 1963 and 1991 censuses recorded the population of the town as 208,546 and 532,088 respectively. The projected population of Ilorin in 2005 when this research was carried out was 748,150 based on an assumed annual growth of 3.5 percent.
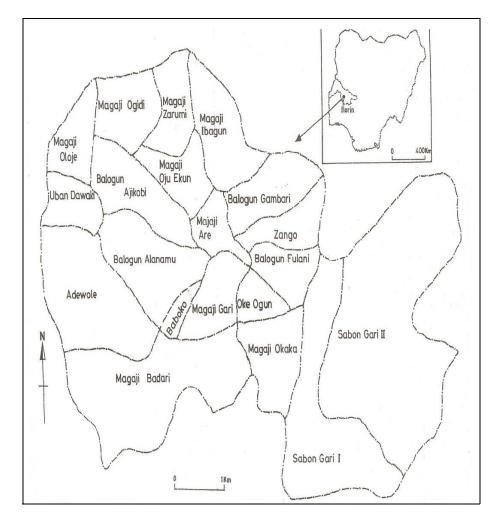

Figure 2 : Map of Ilorin, the sampled wards.

IV. Temporal Fixity of Activities

To establish the temporal nature (fixity) of activities, respondents were asked whether they could have done anything else at the time they did a particular activity. The number of respondents that answered this question was 296. The result shows that 280 (94.6%) respondents said they could not do anything else at the time

Table 1 : Temporal fixity and activity location.

Activity type	Could you have done anything else at this time?					
	Yes	%	No	%	Total	%
Home based	14	4.72	112	37.8	126	42.57
Office/work place	2	0.68	166	56.08	168	56.76
Outdoor	_	_	2	0.69	2	0.69
Total	16	7.43	280	91.9	296	100

This result, however, varies with different socio-demographic groups:

a) Gender, marital status and activity fixity

Among the males, 5.4 per cent could do something else at the time while 94.6 percent indicated that they could not do anything else at the time they were engaged in a particular activity. Among the were females none could do something else at the time they engaged in a particular activity, 47.0 percent had their activity fixed in time.

Among the married respondents 4.1 percent can do something else at a time and 45.6 percent had their activities fixed in time. Among the singles, 1.4 percent could do something else and 49.0 percent had their activities fixed in time.

Table 2 : Gender/Marital status and Activity fixity.

Could you have done anything else at the time	Gender						Marital Status					
	Male	%	Female	%	Total	%	Married	%	Single		Total	%
Yes	16	5.4	_		16	5.4	12	4.1	4	1.4	16	5.4
No	141	47.6	139	47.0	280	94.6	135	45.6	145	49.0	280	94.6
Total	157	53.0	139	47.0	100	100.0	147	49.7	149	50.3	296	100.0

Source : Field work, 2005.

b) Religion, Age and Activity Fixity

Among people of different religious and age groups, temporal fixity of activity varies. Table 2 shows that s 4.1 percent Christians and 1.4 percent Muslims could have done something else at the time, while 47.3 percent each among Christians and Muslims respectively could not trade off the times they were performing their activities. Among people of different age groups, 1.5 Percent, 3.1 percent and 6.2 percent of the respondents between ages 18-30 years, 31-45 years and 46-60 years respectively could do something else at the period they were performing activities, while 51.4%, 39.0% and 3.5% among the 3 respective age groups had their activities fixed in time.

Table 3 : Religion/age and Activity Fixity.

Could you have done anything else at that time	Religion						Age Group							
	Christianity	%	Islam	%	Total	%	18-30	%	31-45	%	46-60	%	Total	%
Yes	12	4.1	4	1.4	16	5.4	4	1.5	4	1.5	8	3.1	16	6.2
No	140	47.3	140	47.3	280	94.6	101	39.0	101	39.0	9	3.5	243	93.8
Total	152	51.4	144	48.6	296	100.0	137	52.9	105	40.3	17	6.6	259	100

Source : Field work, 2005.

c) Education qualification and activity fixity

Furthermore temporal fixity of activity varies among people of different educational qualification. As shown in Table 3, activity fixity varies among respondents with different qualifications. Among respondents with primary education, NCE and other qualifications, they all had their activities fixed in time with 1.4%, 23.6% and 1.4% respondents having their activities fixed in time. Among secondary, polytechnic and university degree holders 1.4%, 0.7% and 3.4% respondents can trade off their activity times while among the same group, 32.1%, 12.5% and 29.1% had their activity fixed in time.

Table 4 : Educational qualification and activity fixity.

Could you have done anything else at the time	EDUCATION QUALIFICATION												Total	%
	Primary	%	Secondary	%	NCE	%	Poly	%	University	%	Others	%		
Yes			4	1.4			2	0.7	10	3.4			16	5.4
No	4	1.4	91	30.7	70	23.6	35	11.8	76	25.7	4	1.4	280	94.6
Total	4	1.4	95	32.1	70	23.6	37	12.5	86	291.	4	1.4	296	100.0

Source : Field Work, 2005.

d) Occupation type and Activity Fixity

Temporal fixity of activity also varies among people with different occupations. Among the artisans/technicians, students and those with other occupations, their activities were fixed in time with 28 (9.6%), 60 (20.6%) and 3 (1.0%) respondents who could not do anything else at the time of performing their activities. Among civil servants, traders and professionals, 3.4%, 1.4% and 0.7% respectively could do some other things else at the time of their normal activities. On the other hand 39.5%, 16.8% and 6.9% among the same group had their activities fixed in time, as shown in Table 5

Table 5 : Occupation type and Activity Fixity.

Could you have done anything else at the time	OCCUPATION												%	Total
	Civil Service	%	Trading/ Business	%	Artisan/ Technician	%	Profe-ssional	%	Students	%	Others	%		
Yes	10	3.4	4	1.4	–	–	2	0.7	–	–	–	–	16	5.5
No	115	39.5	49	16.8	28	9.6	29	6.9	60	20.6	3	1.0	275	94.5
Total	125	43.0	53	18.2	28	9.6	22	7.6	60	20.6	3	1.0	291	100

Source : Field work, 2005.

e) Nature of Activity and Activity Fixity.

There is also a difference between the nature of activity (i.e. whether an activity is arranged, planned, routine or unplanned) and its temporal fixity.

Table 6 : Nature of activity and fixity of activities.

Nature of Activity	Could you have done anything else at the time				Total	%
	Yes	%	No	%		
Arranged	–	–	28	9.5	28	9.5
Planned	–	–	04	1.4	4	1.4
Routine	16	5.4	248	83.8	264	89.2
Total	16	5.4	280	94.6	296	100

Source : Field work, 2005.

From Table 6; it is evident that the nature of activity determines its time fixity. For instance, respondent could not perform "arranged" and "planned" activities at any other time. The entire 9.5% and 1.4% arranged and planned activities could not be done at any other time. While in case of routine activities only 5.4% out of 296 respondents could have done their routine activities at any other time; and the remaining 83.8% had their activities fixed in time.

f) Location of Activity and Activity Fixity

Finally, temporal fixity of activity also varies with the type of activity, i.e. where the activity is based. In

Table 7, 288 (97.3) of the respondents concerned could not have done anything else at that time i.e. they had their activity fixed in time. This comprises 47.6% who were engaged in home based activities, 51.7% who were engaged in office/work place-based activities, and 0.7% who were engaged in outdoor activities. Only 8.0% respondents did not have their activities fixed in time, these were 6.0% and 2.0% who were engaged in home based and office/work place-based activities.

Table 7 : Location of Activity and Activity Fixity.

Activity Location	Could you have done anything else at that time					
	Yes	%	No	%	Total	%
Home based	6	2.02	135	45.6	141	47.6
Office/work place	2	0.7	151	51.0	153	51.7
Outdoor			2	0.7	2	0.7
Total	8	2.7	288	97.3	296	100

Source : Field work, 2005.

The temporal fixity of activities was further established when it was asked if these activities could be done at some other time. From Table 8, it is evident that only 8.5% of the respondent do not have their activity fixed in time. This include 7.4%, 0.7% in

office/work place activities. On the other hand 91.5% of the respondents could not have done their activities at some other time. This includes 40.0% who are engaged in home based activities, 51.0% in office/work place activity and 0.7% in outdoor activities.

Table 8 : Activity location and temporal fixity.

Activity Location	Could you have done this at some other time?					
	Yes	%	No	%	Total	%
Home based	21	7.4	119	40.20	141	47.64
Office/work place	1	0.4	153	51.7	153	51.7
Outdoor	2	0.7			2	0.7
Total	24	8.5	272	91.5	296	100

Source : Field work, 2005.

Temporal fixity of activity varies with different occupational groups as presented in the Table 9 which shows that the majority of the respondent (82.48%) could not have done their activities at some other time. This consisted of 35.73% civil servants, 15.46% traders/businessmen, 8.29% artisans, 4.46% professionals and 17.52% students. The few (17.52%)

who could have done their activities at some other time consisted of people in different occupations as well.

The result of this analysis is related to the one obtained for the earlier question that is, could you have done anything else at that time? (Table 4) where 16 respondents (5.4%) answered in the affirmative and 280 (94.4%) said they cannot. All these go to establish that most of the activities are fixed in time and space.

Table 9: Temporal fixity and occupation type.

Could you have done this at some other time	Occupation												
	Civil Servants		Trading Buss.		Artisan Technical		Professional		Students		Others		Total	
Yes	21	7.21	8	2.74	4	1.37	9	3.0	9	3.0			51	17.52
No	104	55.73	45	15.46	24	8.27	13	3.46	51	17.2	3	0.10	240	82.48
Total	125	42.95	53	18.21	28	9.62	22	7.56	60	20.61	3	0.10	291	100

Source : Field work, 2005.

From the analysis above, the temporal nature of the activities of the respondents is mainly routine. That is, they perform the same type of activities everyday and these activities are fixed in time irrespective of the socio-economic status of respondent and activity type. Since the activities of the respondents were fixed in time and space, there was a generalized pattern in the sequencing of these activities. The fixity in time of the respondents activity is determined by a number of factors. These factors were analyzed by using the stepwise multiple regression analysis. The result of the stepwise regression is presented in Table 10

Table 10 : Stepwise regression analysis for determinants of temporal fixity of activities.

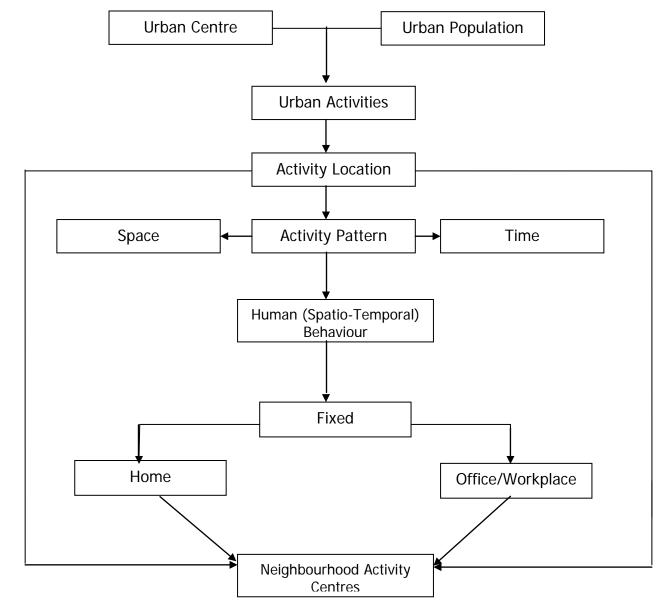| DAY	Model	Step	Variable Description	B	Standard of b	Beta	T	Significance level	R	R²	Adjusted R²	Standard Error
1	1	1	Age (yrs)	-28.502	4.403	-479	-6.474	001	479	.229	.224	526.216
	2	A B	Age (yes) Estimated annual income (₦)	-22.792 -6.13	4.701 .000	-333 -234	-4.849 -2.959	001 004	.524[b]	.274	.264	512.318
	3	A b c	Age yrs Estimated Annual Income Occupation	-21.695 -6.03 69.772	4.682 .000 34.585	-.364 -.230 .145	-4.634 -2.943 2.017	001 004 046	.542[c]	.295	.280	506.792
2.	1 2 3	A b c	Estimated Annual Income (₦) Estimated Annual Income Age (Yrs) Estimated Annual Income Age Yrs Occupation	-1.112E.04 -9.09E.05 -12.069 8.96E.05 -11.811 53.529	.000 .000 3.435 .000 3.401 26.746	-.562 -.454 -.260 -.448 -.225 .134	-8.004 -6.137 -3.514 -6.102 -3.473 2.001	.000 .001 .001 .047	.562[a] .610[b] .624[c]	.315 .372 .390	.311 .363 .376	380.816 366.165 362.242
3	1 2	A b	Estimated Annual Income (₦) Estimated annual income (₦) Ag (Yrs)	-1.3E-04 -9.18E-05 -11.813	.000 .000 3.438	-.563 -.458 -.255	-8.038 -6.187 -3.436	.000 .000 .001	.563[a] .609[b]	.317 .371	.312 .362	380.450 366.470
4	1 2	a b	Estimated Annual Income (₦) Estimated annual income (₦) Ag (Yrs)	-1.14E-04 -9.64E-05 -10.231	.000 .000 3.663	-.555 -.467 -.213	-7.805 -6.142 -2.793	.000 .000 .006	.555[a] .588[b]	.308 .345	.303 .336	397.092 387.592
5	1	A	Age (in Yrs) Estimated Annual Income (₦) Occupation	-5.597 1.782E-05 17.522	3.003 .000 23.538	-.173 .129 .063	-1.864 1.385 .744	.065 .168 .458	.181[a]	.033	.011	317.361
6	1	A	Age (yrs)	-7.507	2.902	-.226	-2.587	.011	.226[a]	.051	.044	326.226
7	1	A	Age (yrs)	-6.922	3.357	-.194	-2.062	.042	.194[a]	.038	.029	338.251

Source Author's analysis, 2006.

The result of the stepwise regression in Table 10 shows that only three steps are possible. The criterion for selecting variables in the analysis is set at 0.05 level of significance. The result shows that age estimated annual income and occupation of respondents are significant. The level of significance is as high as 0.001. This implies that apart from age, annual income and occupation, all other variables are not significant in explaining time devoted to activities; although this variables differ vary from day 1 to 7.

The age factor is significant in the sense that all the sampled respondents fall within the age group of economically viable or productive segment of the population (i.e. between the age brackets of 18 years to 60 years) in all gender, qualification and occupational groups. On the other hand, annual income as a factor significant in explaining time devoted to activities is due to the fact that majority of the respondents belong to low income group, hence they have to work from morning till evening to make ends meet while those in public service engage in multiple occupations. Finally, occupation as a significant factor explains one of the characteristics of third world cities where people engaged in mostly informal sector and self -owned occupations hence they can afford to spend longer time. (Adedokun, 2012, Adedokun and Ajayi, 2012)

Based on the above findings in the study area, we would like to construct a generalized model of land use planning and facility location in a traditional medium size urban center using Ilorin as a case study. (Fig. 2)

Figure 2 : A Model of Urban Neighbourhood Activity Centers.

Source : Author's analysis (2009).

Given a medium size urban centre with its population, there would emerge various types of urban activity located in different parts of the city. The location of these activities would in turn generate activity pattern in space. The activity pattern itself would generate human spatial behavior. In the study area, the human behaviour in time was fixed. The fixity in human spatial behaviour is shared between home and office/work place. The urban neighbourhood activity centre model is of the view, therefore, that in planning for a medium size urban centre in developing world; there may be the need to adopt a strategy that would incorporate the behaviour of the people. Instead of strict land use zonation approach, facilities may be located closely to or around neighborhoods where people are fixed to. In this case and as demonstrated, facilities and infrastructures should be located between homes and work places. Obviously, if there is a demonstrable linkage between two activities in space, it makes sense to locate the facilities housing them in the same space so as to eliminate time and energy consuming travel.(Adedokun, 2008, 2009, 2011)

References Références Referencias

1. Adedokun, O. M. (2008) A Spatio-Temporal Analysis of Activity Linkages in Ilorin, Kwara-State. *Savanna* 2,1 pp41-52
2. Adedokun, O. M. (2009) A Spatio-Temporal Analysis of Urban Activity Linkages: A Case Study of Ilorin, Nigeria. *Unpublished Ph.D Dissertation,* Ahmadu Bello University, Zaria.
3. Adedokun, O.M. (2011) An Analysis of the Temporal Pattern of Daily Activities in a Traditional African city and its Implication for urban infrastructural planning: A case study of Ilorin, Nigeria. *International Journal of Social Sciences and Humanities Review.* Vol. 2, No. 4 pp 36-46
4. Adedokun, O.M. and D. D. Ajayi (2012) A Model of Urban Infrastructural Planning in a Traditional African city : A case study of Ilorin Nigeria, in Jaroslav Burian (ed) *Advances in Spatial Planning.* Croatia, Intec web Press, Chapter 4, pp 61-74
5. Haggerstand, T. (1969) What about People in Regional Science. *Regional Science Association* 24.
6. Joh, G.H., T.A. Arentze and H.J.P. Timmermans (2005) A Utility-based analysis of activity time allocation decisions underlying segmented daily activity-travel patterns *Environment and Planning* A 37, 11 pp.105-125.
7. Kwan, Mei-Po, (2002) 'Time, Information Technologies and the Geographies of Everyday Life' *Urban Geography* 25, 5, 471-482.
8. Kwan, Mei-Po, (2003[a]) *New Information Technologies, Human Behaviour In Space Time and the Urban Economy* Paper Presented at the 82nd Annual Meeting of Transportation Research Board (TRB) Washington D.C. Jan 12-16
9. Kwan, Mei-Po, (2003[b]) 'Geovisualization of Activity Travel Patterns Using 3D Geographical Information Systems' Paper Presented at 10th International Conference on Travel Behaviour Research. Luierne. Aug. 10-15.
10. Kwan, Mei – Po (2005) Measuring Activity and Action Space/time in Martins E.H.,Lee-Gosselin and T. D. Seen (eds) *Integrated Land-Use and Transportation Models: Behavioural Foundaations.* Oxford: Pergamon-Elsevier pp 101-132
11. Main, H.A.C. (1982) Time–Space Study of Daily Activity in Urban Sokoto, Nigeria Unpublished Ph.D Thesis, University of Liverpool, U.K.
12. Oloru, A. J. (1998) *A Guide to Ilorin. Ilorin.* Famost Press.

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