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TEMPORAL TRENDS IN AGGLOMERATION ECONOMIES AMONGST FIRMS IN THE LAGOS REGION, NIGERIA

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Abstract
This paper examined the temporal trends in agglomeration economies amongst firms, using the Lagos region as a case study. The primary data were collected in two different stages; the reconnaissance survey and questionnaire administration. All the 103 firms recognized in the twelve industrial estates during the reconnaissance survey were covered in the questionnaire administration. Secondary data such as the number of industrial estates and number of firms in each industrial estate were collected from Lagos state Ministry of Commerce and Industry and Lagos State Ministry of Economic Planning. The paper reveals tremendous agglomeration benefits between 2008 and 2012, in the forms of transportation economies, collaboration in Research and Development (R&D), labour economies, raw material purchase/supply economies, water supply economies, power economies, security economies, joint ports and shipping, waste treatment economies, telecommunication economies and access to financial institutions. It also reveals that agglomeration economies were highest in 2009. The paper concluded that agglomeration policy could be a potent tool of economic revival, through its multiplier effects on the economy of a region. It is however recommended that agglomeration of firms should be encouraged and strengthened through active participation of government in the industrial sector, giving tax holiday to younger investors, making the location factors to be liberal, relaxing the laws governing the importation of some raw materials, as such assistance can have positive impact on productions. Financial aids should be given to these industries in form of loan, while the collateral securities should be made affordable for the investors. Agglomeration policy could be further harnessed to launch African countries into the desired goal of rapid industrialization, and also, help to significantly transform the economy of the continent.

Key words: *Agglomeration Economies, Firms, Lagos Region, Temporal trends, Regional innovation, Economy.*

Introduction

The concentration of the production facilities of a single firm or across multiple firms in a single location generates cost-saving scale effects and often leads to further agglomeration of firms through an industrial location process (Weber, 1929; Venables, 2008). Such cost saving effects of agglomeration is often called agglomeration economies. Agglomeration and clustering have tremendous positive effects on regional development. These economic boosters tend to lead to amazing technological and innovation creation which are driving forces or catalysts for total transformation of both social and economic performance of a region on the edge of industrial development.

Recently, the debate and relevance of clustering as alternative strategy for industrial development in developing countries have dominated many discussions in economic literature. There are limited accounts on small and medium enterprises cluster development in Africa. Henderson (2003) gave a detailed analytical break down of four general types of cluster identified in Africa. These are: (a) diversified industrial cluster; (b) the sub-contractor cluster; (c) the market town distributive cluster and (d) the specialized conducted in recent times. John (1998) made both theoretical and empirical analyses on the typology of Nairobi's garment industry cluster in

Kenya. Thus, showing the petty commodity cluster. However, series of case-studies on African clusters have characteristics, benefits of clustering and inter-firms relation in the cluster. Van Dijk (1997) also examined the impact of networks in small-enterprises' association in Accra, Ghana. The economic activities in the cluster provided an insight on poverty alleviation strategies of small entrepreneurs in Accra. Mitullah (1996) examined the impact of collective efficiency on the Lake Victoria fishing cluster in Kenya. She analyzed the various market channels, the challenges fishermen face and their responses to quality standard. Oyeyinka (2001) made an empirical enquiry into the "process and dynamics" of cluster growth in Nigeria. In his work, he gave a detailed comparative analysis of Lagos and Nnewi manufacturing clusters. Phillip (1998) further examined the ability of clusters to make positive impact in the African industrialization process by making general analyses on the trend and development of African clusters. Generally, in contrast to the global trend of cluster development, African clusters have not been able to move beyond producing for local markets. This could be, on the one side, as a result of neglect or ineffective policy design or on the other, absence of institutional and technological backing.

There has been a successful story of cluster development in Nigeria, particularly the automobile component industry at Onitsha, Anambra State and the computer village in Otigba in Lagos. The Nnewi automotive cluster, based in Anambra in Southeastern Nigeria, is one of the most longstanding and durable in Nigeria. Building on core entrepreneurial capacities and reinforced by a substantial apprenticeship program and technology transfer networks with Taiwan, the Nnewi cluster has managed to survive over a period, as far back as to the 1980s, spanning some of the most difficult political and economic times that Nigeria has faced. The companies from the Nnewi cluster—many of which have been in operation for between 10 and 20 years— have not relied on government programs and support. Instead, the cluster has relied predominately on its own financial, technical, and entrepreneurial capacities. This includes the investments made to develop key infrastructure services, and to extend their supply chain out to Taiwan, particularly for spare parts and technical know-how. This paper posits that agglomeration policy should be imbibed and intensified in order to transform African states positively.

The Study Area and the Methods.

The Lagos region covers metropolitan Lagos made up of fifty-seven local government areas among which were, Ikeja, Apapa, Mushin, Ikorodu, Epe and Badagry to mention just a few. This region which is situated along the south west of Nigeria, approximately between latitudes $6^0$27' and $6^0$37' north of the equator and longitudes $3^0$15' and $3^0$47' east of Greenwich meridian, with a territorial land area of about 1,088km^2, cover about 32 percent of the land area of Lagos state. About 20 percent of this area is made up of Lagoons and mangrove swamps.

Lagos region is the leading, industrial, commercial, financial and maritime nerve-centre of the country. Over 60 percent of all commercial transactions in Nigeria are carried out or finalized in the Lagos region. About 70 percent of the total value of industrial investments in Nigeria is in the Lagos region. Over 65 percent of the country's industrial employment is concentrated in this region, leaving the remaining 35 percent in other parts of the country. It is, in part, the recognition of the marked concentration of industries in the Lagos region that informed its choice as the study area for this work.

Both primary and secondary data were employed for this study. The first stage in the collection of primary data involves the reconnaissance survey of the study area. All the firms identified during the reconnaissance survey were covered in the questionnaire administration. The questionnaire sought information on such issues as the industry group (line of activity), the location (address/industrial estate/area); the nature, scope and significance of agglomeration amongst firms .The questionnaire was administered such that firms in each of the industrial estates/areas and the outlying firms were visited one after the other. In each case, the questionnaires were left with the industrialist/designated officer to complete. One

hundred and three questionnaire were administered in twelve industrial estates; one questionnaire in each of the firm. Secondary data such as the number of industrial estates and the number of firms in each estate in the Lagos region were obtained from the Ministry of Commerce and Industry, Annual Abstract of Statistics of National Bureau of Statistics, Lagos state Ministry of Economic Planning. Data on manufacturing establishments in the Lagos region between 1970-2008, were sourced from the most recent edition of the Manufacturer's Association of Nigeria (MAN) Industrial Directory. This served as the basic source of secondary data. This Directory contains a list of manufacturing establishments employing at least 10 workers (See distribution of Firms in Table 1).

Table 1 Distribution of firms

S/No	Industrial Estate/Area	Number of Firms	Percentage of Total
1	Apapa	13	12.6
2	Matori	03	2.9
3	Agbara	07	6.8
4	Ikeja	24	23
5	Ilupeju	14	13.6
6	Ijora	03	2.9
7	Iganmu	07	6.8
8	Oshodi/Isolo	10	9.7
9	Ogba	02	1.94
10	Ikorodu	04	3.94
11	Oregun	09	8.7
12	Surulere/Mushin	07	6.8
Total		103	100

Results and Discussion

Firms Agglomeration Benefits in 2008.

Table 2 depicts the 103 (100%) firms indicating a saving as a result of agglomeration economies enjoyed in 2008. Due to joint transportation, 30 (29.1%) enjoyed between 21 and 30% savings, whereas due to joint raw material purchase/supply, 18(17.5%) firms realized between 41 and 50% savings. Another, 9(8.7%) firms realised between 41 and 50% as a result of collaboration in research and development. Furthermore, due to joint labour, 31(30.1%) firms realized <10% gains, while 72(70%) saved <10% due to joint water supply.

Table 2 further reveals that due to joint waste treatment, 39(37.9%)firms realized <10% savings, whereas 47 (45.07%) realized <10%, due to joint security. Another 69 (67%) firms realized <10% savings as a result of joint telecommunication. Due to joint ports and shipping, 46 (44.5%) firms enjoyed <10% savings, while 12(11.7%) enjoyed <10% as a result of Access to financial institution.

It is therefore apparent that joint transportation constitutes the most important economies enjoyed by firms in year 2008, while joint telecommunication was the least.

Firms Agglomeration Benefits in 2009.

Table 3, reveals the 103 (100%) firms indicating a saving due to agglomeration economies enjoyed in 2009. As a result of joint transportation, 27 (26%) firms realized between 21 and 30% savings, whereas 36(35%) firms realized <10% savings due to joint power supply. Also, as a result of joint raw materials purchase/supply, 5 (4.9%) enjoyed between 61 and 70%, while due to collaboration in research and development, 5(4.9%) enjoyed between 71 and 80% savings. Furthermore, as a result of joint labour, 43(41.7%) firms enjoyed <10%, 9(8.7%) realized between 71 and 80% savings. Another, 65(63%) firms realized <10% savings, as a result of joint water supply.

Moreover, due to joint waste treatment, 50 (48.5%) firms realized <10% savings, 3(2.9%) enjoyed between 61 and 70% benefits. Also, 37 (35.9%) firms realized <10% savings, while

5(4.9%) realized between 61 and 70% as a result of joint security. Another, 76 (73.8%) firms realized <10% benefits due to joint telecommunication. Due to joint ports and shipping, 49(47.6%) firms realized between 31 and 40% savings, whereas due to access to financial institution, 9(8.7%) firms each enjoyed between 81 and 90% and <10% savings.

The dominant economies enjoyed is the access to financial institution, Joint telecommunication was the least economies enjoyed.

Firms Agglomeration Benefits in 2010

Table 4, shows the 103 (100%) firms indicating a saving as a result of agglomeration economies enjoyed in 2010. Due to joint transportation, 26 (25.2%) firms indicates a saving of <10%, 2(1.94%) realized between 81 and 90% benefits. Due to joint power supply, 44 (42.7%) enjoyed <10% savings. Also, as a result of joint raw material purchase/supply, 30 (29.1%) firms enjoyed <10% savings, whereas due to collaboration in research and development, 35 (34%) firms enjoyed <10% gains. Furthermore, due to joint labour, 30(29.1%) firms indicates <10% savings, while 59 (57.3%) firms realized <10% savings due to joint water supply.

Another, 31 (30%) firms realized <10% savings due to joint waste treatment. Also, as a result of joint security, 49 (47.6%) indicates <10% savings, whereas 81 (78.6%) firms realized <10% gains, due to joint communication. Due to joint ports and shipping, 42 (40.8%) firms enjoyed <10% gains%. As a result of access to financial institution, 20(19%) firms enjoyed between 41 and 50% savings.

It is vivid that access to financial institution was the most dominant economies enjoyed by firms, while joint telecommunication was the least.

Firms Agglomeration Benefits in 2011.

Table 5, reveals the 103 (100%) firms indicating a saving due to agglomeration economies enjoyed in 2011. As a result of joint transportation, 29 (28.2%) firms realized <10% savings, while 2 (1.94%) saved between 81 and 90%. Also, 38 (36.9%) firms realized <10% savings due to joint power supply. Another, 26(25.2%) firms enjoyed between 11 and 20% savings as a result joint raw material purchase/supply. Due to collaboration in research and development, 42(40.7%) firms enjoyed <10% savings, whereas 43(41.7%) firms indicates <10% benefits due to joint labour. Also, 60(58%) firms enjoyed <10% savings as a result of joint waste treatment.

Moreover, 55 (53%) firms indicates <10% savings as a result of joint security, while 79(76.7%) firms realised <10% savings due to joint telecommunication. Due to joint ports and shipping, 51(49.5%) realized <10%) benefits, whereas, 25(24.3%) firms realised between 41 and 50% savings due to access to financial institution. Accesses to financial institution remain the dominant economies enjoyed by firms, while joint telecommunication was the least.

Firms Agglomeration Benefits in 2012.

Table 6 depicts the 103 (100%) firms indicating a saving as a result of agglomeration economies enjoyed in 2012. Due to joint transportation, 40(38.8%) firms realized <10% benefits, whereas 28 (27.2%) realized <10% savings due to joint power supply. Also 31 (30.1%) firms enjoyed <10% gains as a result of joint raw materials purchase/supply, while 36(35%) firms realized<10% benefits due to collaboration in Research and Development.

Also 38(36.9%) firms enjoyed <10% savings as a result of joint labour, whereas 69 (67%) firms enjoyed <10% savings due to joint water supply. Another, 25(24.3%) firms realized between 11 and 20% savings due to joint waste treatment, while 42 (41%) firms enjoyed <10 savings as a result of joint security. Due to joint telecommunication 55 (53.4%) firms realized <10 savings, whereas 32 (31.1%) firms realized <10% benefits due to joint shipping. As a result of access to financial institution 6(5.8%) enjoyed between 61 and 70% savings.

It can be deduced that access to financial institution constitutes the most important economies enjoyed by firms, while joint telecommunication was the least.

Conclusion

This paper has revealed the temporal trends in agglomeration economies enjoyed by firms in the Lagos region (i.e. between 2008 and 2012). It has shown significant benefits as a result of

agglomeration of firms in the Lagos region. It reveals that in 2008, joint transportation was the most dominant economies enjoyed by firms, while between 2009 and 2012; access to financial institution constitutes the most dominant economies enjoyed. Also, joint telecommunication was the least economies.

The paper further shows that agglomeration economies were highest in 2009. It was vivid that agglomeration economies amongst firms in the Lagos region were not strong enough, because those firms enjoying less than 40% were far greater than those enjoying between 41 and 100%. It must be noted that Studies on agglomeration economies amongst firms have largely focused on the advantage of geographical proximity of industries and its ability to boost the economic performance of a region. This paper therefore, posits that agglomeration economies could be better understood from temporal trends perspectives.

Recommendation

Agglomeration and clustering of firms are tending to be a panacea to social and economic development. It is therefore, recommended that agglomeration of firms should be encouraged and strengthened through the active participation of government in the industrial sector of the economy, by providing tax - holiday to younger investors, making location factors to be liberal, and relaxing the laws governing the importation of certain raw materials. This incentive can make significant positive impact on productivity. Financial aids should be given to new industries in the form of loan, with the collateral securities made affordable to promote further investment in the industry.

Agglomeration policy can be further harnessed to launch African countries into the desired goal of rapid industrialization and, also, help to transform the overall economy of the continent.

Table 2: The Benefits (savings) Enjoyed by Firms in 2008

% Savings	Joint transport		Joint power supply		Joint raw material P/S		Collaboration R &D		Joint labour		Joint water supply		Joint waste treatment		Joint security		Joint telecommunication		Joint ports & shipping		Access to financial institution	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	16	15.5	49	47.6	9	8.7	50	48.5	31	30.1	72	70	39	37.9	47	45.6	69	67	46	44.5	12	11.7
11-20	13	12.6	12	11.7	15	14.6	16	15.5	20	19.4	18	17.5	15	14.6	32	31.1	18	17.5	27	26.2	15	14.6
21-30	30	29.1	09	8.7	14	13.6	10	9.71	15	14.6	6	5.8	20	19.4	08	7.8	09	8.7	11	10.6	22	21.4
31-40	10	9.71	08	7.8	20	19.4	10	9.71	14	13.6	02	1.94	13	12.6	09	8.7	02	1.94	09	8.7	20	19.4
41-50	15	14.6	06	5.8	18	17.5	9	8.7	10	9.71	04	3.9	7	6.8	06	5.8	03	2.9	5	4.9	15	14.6
51-60	10	9.71	10	9.71	14	13.6	5	4.9	7	6.8	0		4	3.9	01	0.97	1	0.97	3	2.9	10	9.71
61-70	05	4.9	04	3.9	06	5.8	2	1.94	5	4.9	01	0.97	4	3.94	-	-	1	0.97	2	1.94	4	3.9
71-80	02	1.94	3	2.9	04	3.9	1	0.97	1	0.97	-	-	1	0.97	-	-	-	-	-	-	3	2.9
81-90	02	1.94	2	1.94	3	2.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.97
91-100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.97
Total	103	100	103	100	103	100	103	100	103	100		100	103	100	103	100	103	100	103	100	103	100

Table 3: The Benefits (savings) Enjoyed by Firms in 2009

% Savings	Joint transport		Joint power supply		Joint raw materials P/S		Collaboration R &D		Joint Labour		Joint Water Supply		Joint waste treatment		Joint security		Joint telecomm		Joint port & shipping		Access to financial institution	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	25	24.3	36	35	34	33	41	39.8	43	41.7	65	63	50	48.5	37	35.9	76	73.8	49	47.6	09	87
11-20	16	15.5	09	8.7	05	4.9	07	6.8	13	12.6	09	8.7	10	9.71	12	11.7	09	8.7	15	14.6	14	13.6
21-30	27	26	30	29.1	13	12.6	02	1.94	10	9.71	20	19	10	9.71	10	9.71	10	9.71	10	9.71	19	18.4
31-40	10	9.71	10	9.71	20	19.4	19	18.4	08	7.8	6	6	13	12.6	14	13.6	06	5.8	02	1.94	12	11.7
41-50	09	8.7	06	5.8	19	18.4	16	15.5	09	8.7	2	1.94	09	8.7	10	9.71	02	1.94	08	7.8	10	9.71
51-60	7	6.8	06	5.8	06	5.8	08	7.8	08	7.8	1	0.97	07	6.8	12	11.7	-	-	07	6.8	15	14.6
61-70	6	5.8	04	3.9	05	4.9	4	3.9	03	2.9	-	-	03	2.9	05	4.9	-	-	09	8.7	10	9.71
71-80	2	1.94	01	0.97	1	0.97	5	4.9	09	8.7	-	-	01	0.97	02	1.94	-	-	03	2.9	05	4.9
81-90	1	0.97	01	0.97	-	-	1	0.97	-	-	-	-	-	-	1	0.97	-	-	-	-	09	8.7
91-100	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	103	100	103	100	103	100	103	100	103	100		100	103	100	103	100	103	100	103	100	103	100

Table 4: The Benefits (savings) enjoyed by Firms in 2010

% Savings	Joint transportation		Joint power supply		Joint raw materials P/S		Collaboration R &D		Joint labour		Joint Water Supply		Joint waste treatment		Joint Security		Joint telecomm		Joint port & shipping		Access to financial institution	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	26	25.2	44	42.7	30	29.1	35	34	30	29.1	59	57.3	31	30	49	47.6	81	78.6	42	40.8	14	13.6
11-20	17	16.5	12	11.7	04	3.9	12	11.7	12	11.7	12	11.7	20	19	21	20.4	12	11.7	21	20.4	10	9.71
21-30	12	11.7	18	17.5	01	0.97	7	6.8	11	10.7	19	18	10	9.71	10	9.71	7	6.8	13	12.6	18	17.5
31-40	16	15.5	8	7.8	10	9.71	10	9.7	10	9.71	8	7.8	19	18	15	14.6	2	1.94	9	8.7	12	11.7
41-50	10	9.71	7	6.8	6	5.8	15	14.6	15	14.6	2	1.94	10	9.71	05	4.9	1	0.97	6	5.8	20	19
51-60	09	8.7	5	4.9	16	15.5	12	11.7	11	10.7	2	1.94	7	6.8	02	1.94	-	-	8	7.8	6	5.8
61-70	06	5.8	8	7.8	15	14.6	05	4.9	6	5.8	1	0.97	2	1.94	01	0.97	-	-	-	-	7	6.8
71-80	05	4.9	1	0.97	15	14.6	05	4.9	7	6.8	-	-	3	2.9	-	-	-	-	4	3.9	6	5.8
81-90	02	1.94	-	-	4	3.9	02	1.94	-	-	-	-	1	0.97	-	-	-	-	-	-	5	4.9
91-100	-	-	-	-	2	1.94	-	-	1	-	-	-	1	0.97	-	-		-	-	-	5	4.9
Total	103	100	103	100	103	100	1-03	100	103	100		100	103	100	103	100	103	100	103	100	103	100

Table 5: The Benefits (savings) Enjoyed by Firms in 2011

% Savings	Joints Transportation		Joint Power Supply		Joint Raw Material P/S		Collaboration in R & D		Joint labour		Joint Water Supply		Joint waste treatment		Joint Security		Joint telecomm		Joint port & shipping		Access to financial institution	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	29	28.2	38	36.9	24	23.3	42	40.7	43	41.7	60	58	53	51.5	55	53	79	76.7	51	49.5	20	19.4
11-20	10	9.71	18	17.5	26	25.2	12	11.7	18	17.5	19	18	06	5.8	16	15.5	15	14.6	7	6.8	17	16.5
21-30	20	19	9	8.7	9	8.7	3	2.9	17	16.5	9	9	12	11.7	12	11.7	8	7.8	13	12.6	12	11.7
31-40	10	9.71	1	0.97	6	5.8	10	9.71	4	3.9	10	10	11	10.7	7	6.8	1	0.97	10	9.71	07	6.8
41-50	14	13.6	19	18.4	12	11.7	17	16.5	15	14.6	3	3	8	7.8	5	4.9	-	-	5	4.9	25	24.3
51-60	10	9.71	9	8.7	17	16.5	9	8.7	06	5.8	2	1.94	10	9.71	5	4.9	-	-	12	11.7	9	8.7
61-70	05	4.9	7	6.8	8	7.8	8	7.8	-	-	-	-	1	0.97	2	1.94	-	-	5	4.9	5	4.9
71-80	1	0.97	2	1.94	1	0.97	2	1.94	-	-	-	-	1	0.97	1	0.9	-	-	-	-	3	2.9
81-90	2	1.94	-	-	-	-	-	-	-	-	-	-	1	0.97	-	-	-	-	-	-	5	4.9
91-100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	103	100	103	100	103	100	103	100	103	100	103	100	103	100			103	100	103	100	103	100

Table 6: The Benefits (savings) Enjoyed by Firms in 2012

% Saving	Joint transport		Joint power supply		Joint raw materials P/S		Collaboration R &D		Joint labour		Joint Water Supply		Joint waste treatment		Joint Security		Joint telecomm		Joint port & shipping		Access to financial institution	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<10	40	38.8	28	27.2	31	30.1	36	35	38	36.9	69	67	20	19.4	42	41	55	53.4	32	31.1	08	7.8
11-20	19	18.4	08	7.6	14	13.6	23	22.3	9	8.7	21	20	25	24.3	14	13.6	31	30.1	18	17.5	19	18.4
21-30	4	3.9	21	20.4	10	9.71	12	11.7	15	14.6	5	4..9	18	17.5	12	11.7	15	14.6	16	15.5	18	17.5
31-40	9	8.7	13	12.6	12	11.7	10	9.71	20	19	3	2..9	16	15.5	19	18.4	2	1.94	10	9.71	5	4.9
41-50	12	11.7	15	14.6	11	10.7	16	15.5	7	6.8	2	1..94	13	12.6	06	5.8	-	-	10	9.71	32	31.1
51-60	8	7.8	6	5.8	09	8.7	4	3.9	7	6.8	2	1..94	6	5.8	05	4.9	-	-	8	7.8	8	7.8
61-70	5	4.9	7	6.8	8	7.8	2	1.94	3	2.9	-		4	3.9	03	2.9	-	-	5	4.9	6	5.8
71-80	4	3.9	4	3.9	5	4.9	-	-	4	3.9	1	0..97	1	0.97	02	1.94	-	-	4	3.9	3	2.9
81-90	2	1.94	1	0.97	3	2.9	-	-	-	-	-		1	0.97	-	-	-	-	-	-	2	1.94
91-100	-	-	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	2	1.94
Total	103	100	103	100	103	100	103	100	103	100	103	100	103	100	103	100	103	100	103	100	103	100

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