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Compelling Impacts of the Telephone, Literacy and Other Related Factors on the Development of Mass Communication Media

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Abstract

The article explores the role which literacy, roads, public education, telephones and electrification play in the development of the mass media. It contends that these predictor variables or media stimulators are important in influencing mass media development, but that this influence is disproportionately exerted by telephones and levels of literacy. The article concludes that in trying to bridge the mass communication gap between the developed and the less-developed countries, better results will be achieved in investing more on telephone services, literacy programmes, electricity systems and other extra-media stimulators along with media investment.

Résumé

Cet article fait le point du rôle que joue l'alphabétisation, les routes, l'éducation, le téléphone et l'électrification dans le développement des mass média. Il affirme que ces variables explications ou stimulations sont inportantes influent sur le développement des médias, mais cette correlation s'avère positive pour le téléphone et le niveau d'alphabétisation.

L'auteur arrive à la conclusion selon laquelle le fossé entre pays développés et sous-développés peut être comblé grâce à des investissements dans le services téléphoniques, les problèmes d'alphabétisation et l'électrification ainsi que dans d'autres facilitateurs dans le cadre des projets d'investissement dans les systèmes de communication.

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Development of mass communication media in the nations of Africa, Asia, and Latin America, has continued to engage the attention of communication scholars. A great deal of work has been done in the broad area of national development, including mass media development. The bulk of the research has usually been in the typical Lerner (1964) tradition of matching an index of mass media development against indices of other aggregate level factors in a recursive model with the aim of finding out which factors precede which in the national development process.

Most of the studies have consistently shown that the level of literacy in any society is an important variable accounting for mass media development. However, beyond this importance of literacy, very little else is known about the configuration of aggregate-level factors responsible for the development of the mass communication media.[1] Knowledge of such factors will provide an insight into the proper place of the mass media in the national development equation. Thus, the issue of which critical variables operate with literacy to stimulate mass media development deserves empirical research attention.

The purpose of this study is to explore the role which certain aggregate-level factors, including literacy, play in the development of the mass media. The factors, which Schramm has called "extenders" of, and "auxiliary services" for, the mass media, are roads, level of literacy, public education, telephones and electrification. According to Schramm (1964):[2]

> "How fast the mass media grow depends in part on how fast certain elements of society grow. For example, the printed media are limited by the growth of literacy .... where electrical mains are available in a country, there it is easier to install radio transmitters and receivers, film projectors, and printing machinery. Growth rates of all the media are immensely stimulated by the spread of public education, and slowed by the lack of it" (p. 106).

Schramm states, in other words, that roads, telephones, literacy, public education and electrification are among the "extenders" and "auxilliary services" which no nation can afford to ignore in its development planning if it wants to "stimulate" the growth of its mass media system.

No substantive empirical tests of Schramm's hypothesis as it pertains to the role of "extenders" and "auxilliary services" have been undertaken since it was formulated 20 years ago, but communication scholars have very often taken the hypothesis as a truism and readily cite a lack of the factors enumerated by Schramm as formidable barriers to mass media development. An empirical test of the hypothesis is called for to see if it

represents an accurate conception of the reality of mass media development.

In many less developed countries, the private potential investor in a newspaper or radio station often hesitates to do so because he or she feels that the business venture is not likely to be a profitable proposition, in view of the lack, or poor conditions, of such basic facilities and indicators as roads, telephones, electricity, and widespread literacy (Nair, 1967; Edeani, 1970).[3] For the private investor, therefore, it is more prudent to invest in other business enterprises than in the mass media. Also government harassments of editors and other professionals of privately owned media can often culminate into a premature death of a newspaper or radio broadcasting company

Such harassments sometimes result from irresponsible reports and comments in the privately owned press by journalists who are not well trained to exercise necessary restraint in their writing. But more often the harassments occur because officials themselves are not sufficiently experienced to tolerate unpleasant news and commentaries with grace, but rather are quick to pounce on offending journalists in the belief that by suppressing them the chances of the press succeeding in inciting the population to revolt might be forestalled or at least minimized.

The direct result of this state of affairs usually takes one of three forms: first, the government may step in to establish its own mass media and often in the process end up monopolizing the business (Hachten, 1971; Wilcox, 1975; Pierce, 1979);[4] second, if the government does not go into the business, foreign media interests may try to fill the vacuum (Hachten 1971; Beltran and Cardona, 1979).[5] One might well argue that investments by governments and by foreign business interests in the mass media would help to develop the system.

But the problem is that foreign owned media are often highly suspect in most less developed countries today as not being in the best interests of the people's self-determination. That is foreign owned media are usually greeted with hostility by the government and sometimes by the public, too, and government owned media suffer from lack of credibility in the eyes of the general public. Finally, if the government is unwilling or unable to establish the media, and prevailing conditions make it unfeasible for foreign interests to establish the needed media, the country may simply slide along without any meaningful media system in place.

Assume that government interference is absent and that a potential investor in the mass media business could find the necessary capital to establish a newspaper or a magazine or a book publishing business. If the available road and transportation facilities are in very poor conditions, if the telephones and electricity supply are severely limited in scope and functionally erratic, and if only a minuscule proportion of the populace is

sufficiently literate to use the mass media effectively, it would still be difficult, if not impossible, for serious-minded entrepreneurs to be attracted to the mass media as profitable investment outlets. These infrastructures are usually provided by governments in less developed countries, and as the governments typically lack the necessary financial resources or the political will and wisdom to speed up their development and modernization, the services and facilities stagnate in their ineffectual conditions for years, thus contributing substantially to the slowing down of the national development process, including mass media development.

However, it is not likely that all of these factors will be equal in predictive strengths in influencing mass media growth. For example, while all of them may be important in influencing newspaper and book development, only telephones and electrification are likely to affect the development of radio and television to any appreciable extent. But all the factors operating in concert may be important in influencing the development of the mass media system as a whole. Following Schramm, one could christen these factors "media stimulators."

Hypotheses

The following hypotheses were formulated to reflect the relationships conjectured here for the mass media stimulators on the one hand and mass media development on the other.

H1: Mass media development is a function of media stimulators (composed of roads, telephones, literacy, public education, and electrification).

H2: Roads, telephones, literacy, public education, and electrification will each exert a statistically significant influence on mass media development.

While Hypothesis 1 is aimed at finding out the extent to which roads, telephones, literacy, public education, and electrification can combine in a single index to predict mass media development (itself made up of radio, television, cinema, newspaper, and book), Hypothesis 2 is meant to explore the relative contributions which the five predictor variables are likely to make in the determination of mass media development.

H3: Roads, telephones, literacy, public education, and electrification will each exert a statistically significant influence on newspaper development.

H4: Roads, telephones, literacy, public education, and electrification will each exert a statistically significant influence on book development.

Electrification is important in the physical setting-up of newspaper and book publishing plants, both electrification and telephones are important in the smooth functioning of such plants, good roads are necessary for the

distribution of products of the plants, and literacy and public education are necessary if newspaper and book copies are to circulate widely in the population.

H5: Roads, telephones and electrification will be more important than literacy and public education in predicting to the development of the cinema.

Telephones and electrification are important in the building and operation of cinema houses, while good roads facilitate people's ability to attend cinema shows. But one does not necessarily have to be literate or to be attending school in order to attend and enjoy cinema shows.

H6: Telephones and electrification will be more important than roads, literacy, and public education in predicting to radio development.

H7: Telephones and electrification will be more important than roads, literacy, and public education in predicting to television development.

While in the long run, roads, literacy, and public education will contribute towards the growth of radio and television in any society, they are probably not as crucial as telephones and electrification are in making it possible for the physical establishment and operation of radio and television broadcasting. It has often been said that radio and television can "leapfrog" the barriers of bad roads and illiteracy, but they don't seem to be able to bypass the influences of telephone and electricity development.

Method

Data were collected on 55 African and 43 Asian and Middle Eastern nations, for a total of 98 countries. The data were taken from the United Nations ***Statistical Yearbook***, the United Nations ***Demographic Yearbook***, the UNESCO ***Statistical Yearbook***, ***The Europa Yearbook***, ***a World Survey***, and the ***Britannica Book of the Year***. The latest issues of these documents were used, except that in a few instances where information on some countries were reported as unavailable in the latest issues, previous issues of the publications containing the information were used. In a few cases where information was lacking for a number of countries and territories on some variables, means of the data on those variables were used in place of the missing information.

The data defining the variables are as follows:

Radio, number of radio receivers per 1,000; ***Cinema***, number of cinema seats per 1,000; ***Newspaper***, number of daily newspaper copies per 1,000; ***Book***, number of book titles per 1,000; ***Roads***, road mileage per 1,000; ***Telephones***, number of telephone receivers per 1,000; ***Literacy***, percentage of the adult population able to read and write; ***Public***

Education, percentage of school-age children enrolled in schools; and *Electrification*, percentage of households having electricity. The composite variable *Media Stimulators*, is composed of the predictor variables roads, telephones, literacy, public education, and electrification, while the other composite variable *Mass Media Development* is made up of the criterion variables radio, television, cinema, newspaper, and book.

One must note the limitations of the data collected from the United Nations publications listed above. The information used in compiling the yearbooks are usually supplied by officials of member-nations, and the accuracy of every bit of the information cannot be guaranteed. Also, some of the information may not necessarily be up to date when the yearbooks are published. Nevertheless, the sources listed are among the best available for the kind of cross-national aggregate data used in the present study, and many previous researchers (Fagen, 1964; Farace and Donohew, 1965; Farace, 1966; Schramm and Ruggels, 1967; Edeani, 1980)[6] have used them as sources of such macro-level data.

Since the variables were measured with different kinds of data, the data were standardized in z-scores in the interest of comparability of results, and analyzed with the multiple regression programme to test the hypothesis presented above.

Results

Hypothesis 1 states that mass media development is a function of media stimulators. The percentage of variance in the composite criterion variable "mass media development" accounted for by the composite predictor variable "media stimulators" is 53 percent ($F = 109.21$: $df = 1,96$ $p < .001$), and Hypothesis 1 is lent support.

The result of the test of Hypothesis 2 is presented in Table 1. That hypothesis states that each of the five original predictor variables - roads, telephones, literacy, public education, and electrification - would account for a statistically significant proportion of variance in mass media development by the five predictor variables is 77 percent, but almost all of this variance was accounted for by telephones, 43 percent ($F = 73.82$; $df = 1,96$; $p < .001$) and literacy, 30 percent ($f = 41.73$; $df = 1,96$; $p < .001$), and none of the three remaining predictors - roads, public education, and electrification - accounted for a statistically significant variation in mass media development as defined. Thus, Hypothesis 2 is lent only a partial support.

The results of the tests of Hypotheses 1 and 2 indicate that whether they are operating collectively in a composite index or individually, the predictor variables are important in influencing mass media development, but that this influence is disproportionately exerted by telephones and level of literacy.

Hypotheses 3 and 4 state that roads, telephones, literacy, public education, and electrification will each account for a statistically significant variation in newspaper development and book development. Also here, only telephones and literacy exerted statistically significant influences on newspaper and book development. Of the 82 percent of the variance in newspaper development accounted for by the five predictors, telephones alone was responsible for 47 percent ($F = 86.76$; $df = 1,96$; $p < .001$) and literacy explained 33 percent ($F = 47.41$; $df = 1,96$; $p < .001$). None of the three other predictors made a statistically significant contribution of variance to the prediction of newspaper development. In book publishing, the total variance accounted for is 34 percent, and telephones explained 23 percent of this ($F = 28.48$; $df = 1,96$; $p < .001$) while literacy explained 10 percent ($F = 10.53$; $df = 1,96$; $p < .001$). Here again, the dominance of telephones and literacy is clear.

Hypothesis 5 states that roads, telephones and electrification would be more important than literacy and public education in predicting to the development of the cinema, and the results of data analysis does not lend support to the hypothesis. Of the total variance of 17 percent explained in cinema development by the five predictor variables, roads, telephones, and electrification accounted for 10 percent ($F = 3.41$; $df = 3,94$; $p < .03$) while literacy and public education explained the remaining 7 percent ($F = 3.5$; $df = 2,95$; p .03). Thus, roads, telephones, and electrification accounted for 3 percent of variance more than did literacy and public education, but this 3 percent difference is not statistically significant ($F = 0.90$; $df = 3,94$; $p <$ .05).

Hypotheses 6 and 7 state that telephones and electrification would be more important than roads, literacy, and public education in predicting to radio development and television development, and data analysis lent support to these two hypotheses. Of the total variance of 41 percent explained in radio development by the five predictor variables, 25 percent ($F = 15.88$; $df = 2,95$; $p < .001$) was explained by telephones and electrification, while 16 percent ($F = 6.16$; $df = 3,94$; $p < .01$) was accounted for by roads, literacy, and public education. This means that telephones and electrification's contribution of variance is higher than that of roads, literacy, and public education by 9 percent ($F = 5.47$; $df = 2,95$; $p < .01$).

The total variance accounted for in television development by the five predictor variables is 77 percent, and telephones and electrification explained 50 percent ($F = 48.30$; $df = 2,95$; $p < 001$) while roads, literacy, and public education explained the remaining 27 percent ($F = 11.41$; $df = 3,94$; $p <$ .001). Thus, telephones and electrification accounted for 23 percent ($F = 22.73$; $df = 2.95$; $p <$ .001) more than did the other three predictors.

Table 1

Summary Table of Analysis of Variance for Effects on Mass Media Development

Criterion Variable	Source of Variation	df	R^2	F	P
Mass Media Dev.	Roads	1	.00813	0.79	> .05
	Literacy	1	.30295	41.73	< .001
	Telephones	1	.43482	73.82	< .001
	Electrification	1	.01943	1.90	> .05
	Pub. Education	1	.00390	0.38	> .05
	Residual	92	.23076		
	Total	97	1.00000		

Table 2

Summary Table of Analysis of Variance for Effects on Newspaper and Book Development

Criterion Variable	Source of Variation	df	R^2	F	P
Newspaper	Roads	1	.00952	0.92	> .05
	Literacy	1	.33043	47.41	< .001
	Telephones	1	.47459	86.76	< .001
	Electrification	1	.00388	0.38	> .05
	Pub. Education	1	.00095	0.09	> .05
	Residual	92	.18063		
	Total	97	1.00000		
Books	Roads	1	.00011	0.09	> .05
	Literacy	1	.09886	10.53	< .005
	Telephones	1	.22866	28.48	< .001
	Electrification	1	.00436	0.42	> .05
	Pub. Education	1	.00941	0.92	> .05
	Residual	92	.65860		
	Total	97	1.00000		

Discussion

In the nations of Africa, Asia, and the Middle East, the supporting facil ties, services, and social indicators, such as roads, telephones, literac public education, and electricity supply, are important factors influenci the development of the mass media. All of them operating in conce contribute toward the stimulation, or retardation, of the growth of the ma media, depending on their levels of development. On the whole, as syste of roads, telephone services, levels of literacy, public school enrollment and electrification systems increase in numbers, radio broadcastin television broadcasting, book publishing, newspaper production, a cinema facilities will likewise grow.

However, some of the stimulating factors are more crucial for t growth of some of the media than for the growth of others. Telephones a literacy are clearly much more important for the development of bo publishing and newspaper production than are all the other three facto combined. Also, telephones and literacy are far and away the mo consequential when the development of the media is examined together a single index. For the development of radio and television, it is telephon and electrification which are the most consequential, thus indicating th while roads, literacy, and public education may contribute to the long-r growth of radio and television broadcasting, it is telephones and electric supply which help more than any of the other factors to propel t development of these electronic media at the present time.

However, the development of the cinema is not markedly influenced any of the five predictor variables, not even roads, telephones, a electrification which ordinarily would be expected to stimulate t establishment and operation of cinema facilities. Even though t influences of telephones and electrification on cinema growth are ea statistically significant, none of the variances explained in cinema grow by these two predictors is above 4 percent, and roads influence on cine development is virtually zero. The total percentage of variance accoun for in cinema growth by the five predictor variables is only 17 perce ($F = 3.71$; $df = 5,92$; $p < .01$), which means that a whole 83 percent remai to be accounted for. In other words, the variables used in the present stu are not the ones crucial for the growth of the cinema industry. Why is t case?

The relatively recent emergence of television on the m communication scene in many parts of the Third World may have result in many substantive and potential cinema goers preferring to sit back home watching television as an alternative form of entertainment. T

economic situation of the populace may be an important predictor of cinema growth. Other factors may include availability of appropriate films, and government policies toward the cinema industry.

But while the influences of the predictor variables are at best minimal on cinema development, they are optimal on newspaper development (82 percent of the variance), on television development (77 percent of the variance), and of course on the overall development of the mass media. It is telephones and literacy, of all the predictor variables, which are mainly responsible for these results, and which throughout this study have exerted by far the most compelling effects on the development of the mass media.

Literacy's performance is not entirely surprising, since it has been shown in previous studies to be closely related to mass media development. The telephone, whose impact on the development of the media are even stronger than those of literacy, is by itself a kind of communication channel as well as a technical source of power and performance fidelity for a humbler of the mass media channels included in this study. This may well explain telephone's superior performance, for its development has more direct implication for the mass media than is the development of any of the other predictor variables.

The magnitudes of telephone's beta weights, which were found to be consistently larger than those of the other independent variables, more clearly reflect its dominant influences on the mass media units, since a beta weight represents the direct effect of one variable on another. The weights are: 752 on mass media development, .534 on radio development, .823 on television development, .597 on book development, .801 on newspaper development, and .214 on cinema development.

In view of the surprising and consistently dominant impact of the telephone, including its relatively high zero-order correlations with the other variables in the study (Table 3), a check was made to see if there was any spuriousness in its relationships with the criterion variables. This involved holding all the other predictors constant and correlating telephones with each of the five original criterion variables. If spuriousness was present in any of its correlations with these variables, such correlations would have disappeared when the other predictor variables were held constant.

The results showed that its correlations with the original criterion variables were not altered in any substantial way, except for its partical correlation with cinema which was depressed from .32 ($p < .01$) to ($p < .05$). The partial correlations were: .50 with radio, .82 with television, .52 with books, .84 with newspaper, and .19 with cinema, most of which were not

markedly different from its zero-order correlations with these variables (Table 3).

Of all the predictor variables, public education and roads exerted the least impacts on the mass media channels. These two predictors and the cinema have relatively very low correlations with other variables in the study (Table 3), and either they are in reality unrelated to the developments of those other variables or their measurements were in error. For example, the use of percentages of school age children enrolled in schools to measure public education might well not have been fully tapping the real character of public education, and such other index as the percentage of graduates from public schools may be a more accurate representation of public education.

Whatever must have been the reasons for the poor showings of these variables in the present study, they deserve to be probed more closely in a future study with perhaps different definitions from the ones used here and hence different complements of data. For instance, transportation could include not only road mileage but also distances by sea and rail, and cinema attendance might provide a more functional and realistic measure than does cinema seats.

In terms of Schramm's hypothesis, however, there is support for it when the "extenders" and "auxiliary services" are considered together in an index as predictors of an index of mass media development. When the factors are considered as individual predictors of the growth of individual media outlets, however, only telephones and literacy are consistently crucial for all the media, both print and electronic, and electrification is important only for radio and television development.

On the whole, the results demonstrate that the less developed countries of Africa, Asia, and the Middle East can ill-afford to neglect the development and modernization of their road systems, their adult literacy programmes, their public school systems, their telephone services, and their electricity supply systems if they hope to speed up the development of their mass media systems. They would do well to pay particular attention to the improvement of their literacy programmes, and even more special attention to the improvement of their telephone systems, and electricity generating and supply facilities, for these are the outstanding stimulators of the growth of the mass media.

As Pool (1971)[7] has observed, "the importance of the telephone cannot be underestimated .... A call that saves a trip produces quantifiable savings in terms of travel expenses, vehicle depreciation, time spent, etc. .... A telephone can make possible a significant increase in the feedback for developmental programming on radio and television" (p. 21).

Table 3

Zero-order Correlation Matrix for the Predictor and Criterion Variables

		1	2	3	4	5	6	7	8	9	10	11	12
1.	Mass Media Dev.	1.00	.73	.81	.84	.51	.86	.60	.56	.85	.33	.53	.09
2.	Media Facilitators		1.00	.55	.64	.35	.73	.38	.82	.71	.50	.78	.42
3.	Radio			1.00	.64	,51	.60	.32	.39	.62	.27	.41	.09
4.	Television				1.00	.48	.86	.30	.50	.87	.22	.49	.02
5.	Books					1.00	.64	.02	.31	.57	.06	.22	.01
6.	Newspaper						1.00	.26	.58	.89	.26	.53	.10
7.	Cinema							1.00	.28	.32	.28	.25	.12
8.	Literacy								1.00	.53	.28	.68	.17
9.	Telephones									1.00	.20	.50	.06
10.	Electrification										1.00	.19	.03
11.	Pub. Education											1.00	.17
12.	Roads												1.00

Any correlation coefficient below .21 is not statistically significant.

It is perhaps the ability of the telephone not only to stimulate savings in cash and kind but also to facilitate the flow of communication which particularly recommends it as one of the most important energizers of mass media development. It is in view of this importance of the telephone that MacBride and other members of UNESCO's International Commission for the Study of Communication Problems have expressed concern over slow development of the telephone in many nations of the Third World when they state as follows in their report (1981) .

> It appears to us that the slow development in many countries of telecommunication facilities and services is a real obstacle both to persons and societies. It is not sufficiently recognised that these facilities and services are .... a precondition of overall development and even of domocratic life ..... Here is an area of communication which needs to be reconsidered in many countries, particularly in view of its social, economic, and cultural significance (p. 55).

The neglect of the development of the telephone may well be an important factor contributing to the slower pace in the growth of the mass media in the Third World recently described by Pye (1980).[8] It is a matter for concern that this neglect of telephone development is occuring at a time when there is rapid growth of telephone communication in the advanced countries of the world (MacBride *et al*, 1981),[9] and the situation is contrary to objectives of the much-talked-about New World Information and Communication Order.

Many Third World governments invest relatively little of their annual budgets in their telephone systems, while some others claim to recognize the importance of developing their own systems but pursue policies which constitute formidable obstacles to the growth of those systems. For example, while Nigeria has sunk millions of Naira into the country's erratic telephone system (with very little to show for the huge expense) and federal government officials talk big on how the government will soon expand and modernise the system in order to make telephone services available to most Nigerians, the Posts and Telecommunications Department has quietly increased the application fee for personal telephone service from $250 to the inexplicable figure of $685. The fee for business telephone has of course been increased to a figure far higher than this - around $1000.

This single action will no doubt ensure quite effectively that telephone communication, instead of being made affordable for most Nigerians, will continue more than ever to remain a luxury enjoyed by only a very few, and this includes a very few business enterprises. Other telephone problems similar to Nigeria's abound in most other less developed nations.

However, the results of this study provide a strong support to the view that telephone development is a powerful stimulant to mass media development. The results suggest that in trying to bridge the mass communication gap between the developed and less developed countries as spelled out in the objectives of the New World Information and Communication Order, Third World nations are likely to achieve better results if they channel substantial proportions of their investment capitals to the development of their telephone services, literacy programmes, electricity systems, and other mass media stimulators as well, than they would if they were to invest in mass media per se while neglecting these stimulators of the mass media.

Investing in both sectors at once, as well as in other national development projects, is not an easy task for any nation, especially for a less developed nation. But if the carefully articulated aims of the New World Information and Communication Order which the less developed countries have been vigorously defending are to be attained, the investments have to be made. Most of the nations, especially those which have not committed themselves to socialism, would do well to encourage private enterprise to share in the investment task.

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