Institut für Rundfunkökonomie
an der Universität zu Köln

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A Methodology
for the Graphical Exposition
of Broadcasting Systems

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List of Figures

List of Tables

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A Methodology for the Graphical Exposition
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1. The Market, the State, and the Voluntary Sector
as Alternative Institutions
for the Provision of Broadcasting Programs

There are many international comparative studies on broadcasting systems (or more generally: on media systems). They take very different variables into account, depending on the research questions posed and on the academic background of the researchers. The study at hand follows a common economic approach. It tries to classify and compare broadcasting systems according to the way broadcasting is provided and financed in a country. As this approach is very general, it can be used both for traditional broadcasting programs (radio and television programs) and new forms of broadcasting (like IP TV and other forms of electronic communion that are based on the internet).

In general economic theory distinguishes three alternative ways to provide goods: the market, the state (government), and the so-called "voluntary" (non-governmental, non-profit) sector. Each of these institutions has advantages and disadvantages, capabilities and weaknesses, which have been discussed in detail in many economic textbooks, both in general and applied to different types of goods or different sectors of economies in particular.[1] Therefore in all existing economies the market, the state, and the voluntary sector are combined. However, the size or relative importance of the three institutions varies. In capitalist economies the market dominates, and the state and the voluntary sector are of relatively little importance; in centrally planned economies the state dominates, and in many traditional or less developed economies the voluntary sector dominates.

What has been said for goods in general also holds true for broadcasting programs in particular. Like other goods, broadcasting (radio and television programs, new forms of electronic mass communication) satisfies private needs of the viewers and listeners on the one hand, e.g. the need to be entertained, to be informed, or to be educated. With regard to these attributes there is a private willingness to pay: Broadcasting programs can be sold to "consumers" by subscriptions, either separately (pay per view) or as program bundles (pay per channel). In addition, broadcasting programs are a most suitable means to catch the viewers' and listeners' attention for advertisements. They therefore are appropriate carriers of commercials and sponsoring messages, which are sold

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[1] Consequences for the broadcasting sector were discussed by SCHULZ/HELD/KOPS 2002, also see KOPS 2007.

to advertising companies. In both forms broadcasting programs can generate private revenues and profits. And they can be provided well by the **market**.

On the other hand market failures or market deficits also apply to broadcasting programs:[1] 1. highly sub-additive costs (economies of scale and scope); 2. non-excludability; 3. production and consumption externalities; 4. information asymmetries; and 5. intransitive consumer preferences. Only few of these deficits are obvious, most are subtle or hidden. In order to discover them, one has to adapt the general economic theory to the peculiarities of broadcasting programs, whilst taking into account the findings of other social sciences (like communication theory, political science, and political journalism). Due to these deficits the market is not as competent in the provision of broadcasting programs as it is for many other consumer goods. And for certain types of broadcasting programs it may fail completely.[2]

The disadvantages relating to commercial and third sector broadcasters could be prevented by **state** broadcasters. A benevolent state broadcaster could and would provide programs of public value that are not profitable (and therefore would not be provided by commercial broadcasters, e.g. educational programs for poor viewers and listeners who are unable to pay for a subscription or buy the advertised goods) or programs with high external benefits (e.g. programs that support the integration and stability of a society, or programs that foster the cultural heritage and traditions of a country and its regions). And – in contrast to the third sector – a benevolent state broadcaster also could and would ensure that the voices of all social groups would be represented, regardless of their motivation and financial or non-financial capabilities.

However, these theoretical capabilities are not really hardly relevant, as state broadcasters are never benevolent. Instead, they attempt to express and popularize the political ideas of the respective government and to ensure that a particular government will be re-elected. This target reduces and biases the content of broadcasting programs with political contents (like news or political debates, reports and commentary). Since the attitudes of governments are supported systematically and the attitudes of political oppositions are systematically suppressed, fair competition between competing political ideas is prevented. Broadcasting then does not serve the citizens´ interests, but the governments' interests exclusively – This risk is reduced (though not abolished), when the respective parliament, not the government, is the decisive authority on broadcasting.

In addition, state broadcasters suffer from some other disadvantages. Compared with commercial broadcasters, they are less efficient (as they do not focus on profit-making), and they also are less consumer-oriented, i.e. they only react slowly to the viewers´ and listeners´ changing program preferences. The

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[1] See SCHULZ/HELD/KOPS 2002; HELM 2005; WARD 2006; KOPS 2007.
[2] For details see KOPS 2007.

latter disadvantage is even higher for broadcasting than for other sectors of the economy, because broadcasting requires a high degree of administrative support, and programming cannot be standardized and qualified – two peculiarities that make the controlling of cost and quality by accounting and benchmarking more difficult (and more important) than in other industries.[1]

For all these reasons state broadcasters are inappropriate program providers. They tend to abuse broadcasting programs to preserve and increase the state's political power. This is especially true when this influence is not based on decisions of the particular parliament (the "state"), but is only performed by the government or certain governing politicians and bureaucrats: this prevents fair political competition.[2]

The **voluntary sector** has neither commercial nor political interests. From that standpoint it could well provide unbiased broadcasting programs that mirror the opinions of citizens. This conclusion, however, requires 1. a strong and diverse civil society with many organizations that champion public affairs and public welfare and that are willing and able to articulate their attitudes via public communication; 2. a government that creates or improves the financial capabilities of civil society (e.g. by granting the right to levy public revenue, e.g. a license fee); 3. a government that does not abuse its role as a sponsor of civil society to influence the (political) opinions of the institutions of civil society.

There are no societies in which these conditions are fulfilled perfectly. Not all relevant groups of society are motivated to engage in public communication to the same degree: some groups have higher motivational powers to lobby for their targets than others. In addition, most civil society organizations suffer from a structural financial scarcity, as they provide public goods that cannot be excluded (and for which no revenues can be levied from the users of the public goods). While governments have sovereign rights to yield revenues and taxes, non-governmental organizations in most countries are restricted to voluntary financial contributions from their members. Most NGOs therefore lack financial revenues, and thus their performance is *less professional* than the performance of governments.

If the state provides institutions of civil society with their own public revenue bases (such as the church tax in Germany) or grants them public money (subsidies), this fiscal scarcity can be abolished. Under these conditions, NGOs can provide goods and services as professionally as governmental organizations or commercial companies. However, with regard to the overall fiscal burden for the

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[1] Additionally, a provision of broadcasting programs by the state may also have distributive defects. See KOPS 2007.

[2] Whereas in this paper the terms „state (broadcasting)" and „government (broadcasting)" are generally used as synonyms, this footnote can indicate that there actually are important differences between a state broadcaster, which is controlled by parliament (i.e. both by the politicians of the government and of the political opposition) and a government broadcaster, which is only controlled by the actual governing politicians (to the disadvantage of the politicians of the actual political opposition).

citizens, the state has to restrict this aid to a few institutions. The chances to produce a sufficient output of better quality become higher for these select few, whereas they simultaneously become lower for all institutions that are not promoted by the state. The chance to participate in public communication is thus distributed unevenly, and the diversity of voices is low. In addition, governments often abuse their positions as sponsors of civil society: They use it as a golden tie to create good behavior from those institutions that get – or want to get – financial support. It is obvious that civil society broadcasters under these conditions can be forced to articulate positive attitudes about the government and to renounce critical reports and statements.

The fact that in many countries non-governmental public provision is not legitimized by formal and transparent forms of collective decision-making should be considered as another disadvantage of it. This especially applies to the non-governmental provision of broadcasting, for which only few countries have explicit rules regarding public decision-making. On the other hand, a non-governmental broadcasting system has some advantages compared to a governmental broadcasting system: While intrinsic motives are important for citizens' voluntary engagement with NGOs (and for the common welfare that is pursued by these organizations), they are less important for governmental organizations (where the engagement of most politicians and bureaucrats primarily attempts to increase income and political power). To prefer governments to NGOs therefore *suppresses such intrinsic motives* that could compensate financial weaknesses and could generate creative and innovative solutions. This especially holds true for broadcasting, where the quality of journalists' work depends heavily on intrinsic motives, such as the search for truth, upholding freedom of information and freedom of expression, and the pursuit of social, cultural, or educational objectives. A non-governmental public provision of broadcasting can, for instance, generate a more profound and deeper journalistic investigation and a broader and more pluralistic scope in content and attitudes than broadcasting provision by government, which would focus on content important for supporting and strengthening the government's position.

For these reasons the evaluation of the voluntary sector is ambivalent. In most countries it is only granted a supplementary role to provide certain program contents that are not sufficiently provided by the market and the state, mainly for smaller, but highly motivated subpopulations (like local communities, religious groups or activists that lobby for certain cultural or educational targets, for the support of disabled or underprivileged people or for the protection of the environment). But the effects of this supplementary role should not be underestimated: Also the quality, variety and objectivity of state broadcasters and commercial broadcasters will be affected positively, if strong civil society media exist as a counterpart and watchdog of the public interest.

The **choice between markets, governments (or states) and NGOs** must be made by trading out the specific advantages and disadvantages described above. For broadcasting programs these advantages and disadvantages have to be evaluated with regard to the economic, journalistic and artistic/creative effects they generate. Due to the peculiarities of these effects, this choice can vary for different types of broadcasting programs. In most countries for instance, entertainment programs are provided to a large extent by markets, since market failures (especially asymmetrical information and externalities) are not very important for this type of programs. By contrast in many countries non-political, educational and information programs are provided by governments that possess the content for these types of programs anyway, as it serves other governmental functions (like the promotion of education and professional qualifications, the support of tourism and international trade, or consumer protection). Also in many countries cultural, political and religious programs are provided by NGOs, like religious communities, local communities, universities, and public service broadcasters, at least to some extent.

This mixture either can be accomplished by running several (at least three) broadcasters, each of which is financed solely by the state, the market, or the voluntary sector ("pure" broadcasters"); or by running one or more broadcasters, which are partly financed by the state, the market, and the voluntary sector ("mixed" broadcasters).[1]

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[1] For details see KOPS 2007.

2. The Revenue Structure as a Main Determinant for the Broadcasters' Program Output

2.1. Financing Broadcasters by the Market, the State, or the Voluntary Sector

There are different ways to steer the program output of broadcasters politically and thus influence its effects on society. Whereas most political scientists and lawyers focus on legal orders and inhibitions, most economists consider them merely a second-best solution. As a first, best solution they pre-suppose an adequate revenue structure. For them the right mix of market revenues, state revenues and revenues from the voluntary sector is the key steering mechanism to determine the behavior and program output of broadcasters.

To illustrate this, we should first imagine the program output of three broadcasters that are funded exclusively by the market, the state, and the voluntary sector, respectively:

1. Broadcasters may be financed solely from *market revenues.* Revenues from advertising, from sponsoring, from merchandising and from program sales should be mentioned as the most abundant forms of commercial revenues. For pay-per-channel and pay-per-view broadcasters subscriptions and viewer payments are most important. These revenues all ensure that the broadcasters offer programs that fit the customers' preferences (where the advertising companies are the customers of advertising funded broadcasters, and the viewers and listeners are the customers of pay per-channel and pay-per-view broadcasters). If there are market failures, these revenues cannot ensure, however, that the commercial broadcasters also provide the programs that are appropriate for public welfare.

   When we again exclude legal orders and inhibitions as measures of adjusting commercial programs´ common interests, financial incentives and disincentives remain as alternative forms of regulation, preferred by economists. The provision of programs with negative externalities e.g. can be reduced by taxes, and the provision of programs with positive externalities can be increased by subsidies. External effects of broadcasting programs thus can be internalized, and commercial broadcasters can be motivated to take the public effects of their programs that run counter to their internal (profit-seeking) purposes into account. Commercial revenues are then complemented by public revenues (either by governmental means or by private donations), and commercial programming is corrected by governmental and public interest programming. In this case commercial broadcasters are actually mixed broadcasters, and the portions of non-commercial revenues determine the importance of the non-commercial programming elements.

2. With regard to the reservations mentioned above, it is doubtful if *state broadcasters* should exist at all. If they are considered useful for certain (narrow) functions (e.g. for the government's obligations to inform people about their political targets and measures), they should be funded by state money that

can be taken from the state's budget (usually from the ministry of information or the like) or from public revenues (grants or tax revenues). However, in order to keep the risk of state indoctrination of broadcasting low, the funding should be restricted to a narrow program scope. For instance it should not provide programs that also can be provided by the voluntary sector (e.g. religious, cultural and educational programs) and it also should not include programs that can be provided in a better and more efficient manner by private companies (like entertainment programs and sports).

3. In principle broadcasters can be financed by *voluntary contributions*, either in cash (donations) or in-kind (honorary services). However, because of the characteristics of broadcasting programs as public goods that cannot (and should not) be exclusively provided to those members of the society that are willing and able to pay, in general voluntary contributions are too small to finance a broad spectrum of high quality programs. Also attempts to increase intrinsic motives (e.g. to publicly honor the donors or to involve them in programming decisions) and to reduce the free rider problem (e.g. by combining public programs with private services) are usually not very successful. For these reasons there are only a few broadcasters that are financed solely through donations or honorary services, and their programs are usually restricted to narrow subjects, for which there is a deep intrinsic motivation to inform and to shape the options of others, such as in local, religious, educational, or cultural matters.

As the abundance of voluntary contributions usually cannot be increased sufficiently, supplementary state and/or market revenues are inevitable for broadcasters that want to cover a wider and varied spectrum of contents of compatible quality. For this reason almost all *public service broadcasters* are supported by grants from the state or even possess the right to exploit their own revenue bases (which are given to them by the state too). In addition many public service broadcasters receive commercial revenues, mainly from advertising and sponsoring, and from program sales.[1]

In general, this mixed revenue structure is acceptable, and it corresponds with the attribute of public service broadcasting as a hybrid system.[2] One should keep in mind, however, that commercial and governmental influences might become dominant and hence jeopardize the public service broadcasters' task of providing program in accordance with the public interest. The actual proportions of commercial and governmental revenues must be determined with regard to the abundance of the voluntary contributions (which varies with the country's political, cultural and economic framework) and with the political and legal safeguards, through which the political and commercial influences on the broadcasters can be reduced.

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[1]   See section 4.2. in KOPS 2007.

[2]   See section 3.3., ibid.

Also from this standpoint the receiving license fee is not a purely voluntary revenue but a revenue mix in itself. It requires the state's decision to allocate it to the public service broadcasters and to enforce the fee payment (which offers the state high opportunities to steer the behavior of public service broadcasters by discretionary varying of the level of the fee or the intensity of enforcing its payments). However, if the yield of the license fee flows directly into the public service broadcaster's purse (supporting the attitude that the revenues originally belong to the public service broadcasters and cannot be varied or even held back totally by the state), it is a good "pragmatic" solution: It entails a higher risk of being influenced by the governments than purely voluntary donations, but this disadvantage is compensated as the license fee creates a higher abundance and thus reduces the dependency on both partial interests of the civil society donors and commercial restraints.

2.2. Revenue Structures, Incentives and Program Outputs

The description of effects that the different revenues have on the broadcasters' program output illustrates the basic assumption that was already mentioned at the beginning of this chapter: Revenues generate certain incentives for the broadcasters' staffs, and these incentives generate certain actions and program output.

1. If a broadcaster is completely financed by *market revenues*, he will act according to the rules of the market. He will attempt to maximize his private profits. The programs are a means for that purpose. The content, the artistic and journalistic style of working, the target audience and the audience flow are deemed to maximize the market revenues: For a commercial broadcaster financed by commercials and sponsoring, for instance, the programs address audiences that are likely to buy the advertised products; for a commercial broadcaster financed by subscriptions, the programs address audiences that are willing to pay for the programs. For these broadcasters the public effects – the public value – of program output is not a target in itself, but will only be created to the extent to which public value is a by-product of private profit making.

2. If a broadcaster is financed completely by *state revenues*, he will act according to the rules of the political system. It the state directly finances and controls them, the programs will focus on content that supports the state. As is the case for commercial broadcasters, the public effects of program output are not the target for state broadcasters as such, but will be created only to the extent to which public value is a result of the political decision-making process. Thus it depends on the political system whether the broadcasters simply maximize the politicians' power and chances to stay in power, or the public succeeds in keeping only those politicians and broadcasters in office, who serve the public interest (as a side product once again).

3. If a broadcaster is financed completely by the *voluntary sector*, it will act according to the expectations and requests of the donors. The program content and the artistic and journalistic style of work are closely related to these ex-

pectations. Public value is created here to the extent to which it is a side effect of the donors' special interests. Therefore, little can be said about the output of a third sector broadcaster in general. It can be as small as the public value of commercial broadcasters (e.g. if only a few private companies donate): it can be as small as the public value of state broadcasters (e.g. if only a few political parties or pressure groups donate). But it can also be large if the civil society feels strongly involved and strongly champions broadcasting.

In practice, this close relationship between funding structure, incentives and program output is spoiled. The funding structure of broadcasters (the input) does not determine the program output in a direct and mono-causal manner. Instead, there are intermediate factors that influence the incentives for the broadcasters' staffs – and hence also the program output, in addition to the revenue structure (see Figure 1): The importance of these intervening factors depends on the peculiarities of the respective broadcasting system and on organizational peculiarities of the broadcasters. Thus the internal gratification rules of two commercial broadcasters that are both completely funded by advertising, for instance, may differ considerably. The incentives for the staff can especially diverge from the incentives that are set by the revenue structure, if these "official" internal gratification rules are not controlled and enforced. The factual gratification rules and the program output may then even contradict the incentives that are set by the revenue structure. In some cases such contradictions can be explained by the fact that the management simply does not understand the donors' intensions; in other cases the management might follow the right targets, but it may have chosen the wrong internal gratifications, and therefore unintentionally may generate faulty program output.

Figure 1:
Causality between the Structure of the Revenues, the Incentives
for the Staff, and the Program Output of Broadcasters,
with the Internal Gratification Rules as an Intermediate Factor
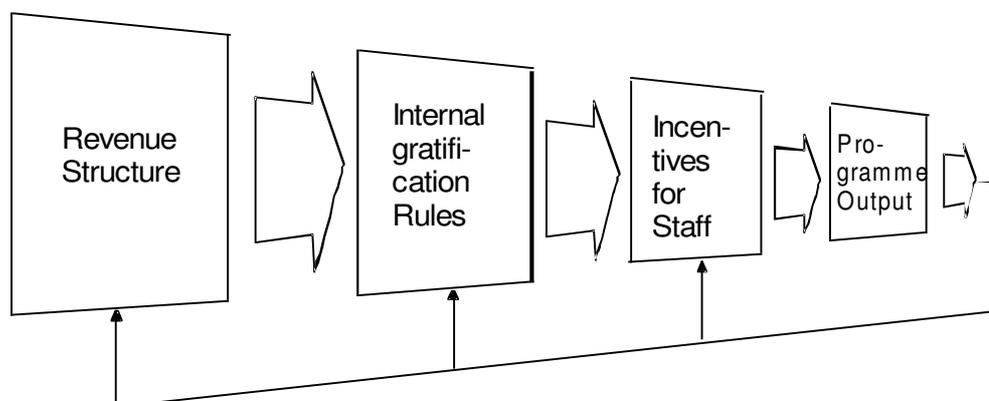
Another fact that makes it difficult to steer the program output of broadcasters by means of incentives that are set for the staff, is the mixture of different types of revenues. Most broadcasters are not funded exclusively by market revenues or state revenues or voluntary revenues, but instead combine all three types of revenues. Therefore different incentives interfere with each other, and the causalities between the type of the revenues, the internal gratifications and incentives they create, and the program output cannot be determined unambiguously. This problem becomes even more complicated when the influence of the different revenues is not proportional to its shares in the overall budget. In spite of these complications, there is strong empirical evidence that the revenue structures of broadcasters substantially determine their program output.[1]

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[1] See Kops 2007 for details.

3. A Geometric Model
for the Exposition of Broadcasting Systems

3.1. A "Magic Triangle" as a Framework
for the Classification of Broadcasters

For an economist it is common to conclude that goods, which the market fails to provide, or for which the provision deviates from the public interest, are provided by the state. This is the usual paradigm of economists, mentioned above as a form of the principle of subsidiarity. In this paradigm, the state is the only alternative to the market, and the market is the only alternative to the state. For many branches, such as infrastructure, the health and the educational sectors, this paradigm conforms to reality by and large.

With regard to our subject matter this could mean either commercial broadcasters or state broadcasters as "pure monistic systems", or it could mean "mixed" broadcasters that combine the de-centralized and horizontal steering of the market (and consequently market revenues) with the central and vertical steering of the state (and state revenues). Figure 2 shows these options in a one-dimensional space, ranging from purely commercial broadcasters on the one (right) side (E, with 0 % state revenues, and 100 % market revenues) via several "mixed" broadcasters (e.g. C with 50 % market revenues and 50 % state revenues) to pure state broadcasters on the other (left) side (A, with 100 % state revenues, and 0 % market revenues).

Figure 2:
State Broadcasting and Commercial Broadcasting

100, 0	50, 50	0, 100
State Broad-casting	Mixed Broad-casting	Commer-cial Broad-casting
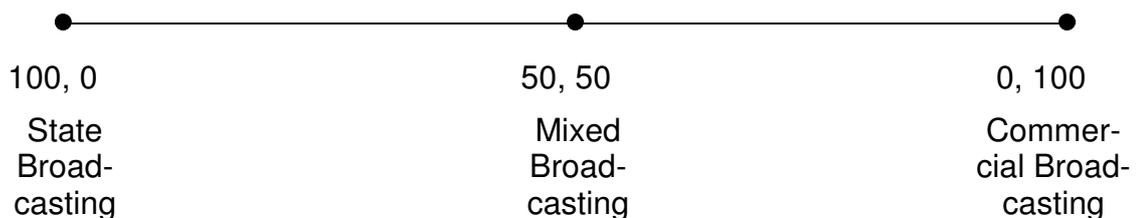
From this point of view one would conclude that state broadcasters should provide TV programs with high market failures and commercial broadcasters should provide TV programs with low or with no market failures. The term "dual broadcasting system", which was mentioned above, indicates this interpretation.

In fact, the reality is quite different. The German broadcasting system does not correspond to such a bi-sectoral structure at all. State broadcasting in Germany does not exist. In Germany the state is regarded as a bad provider of broadcasting programs (and of the media in general). This commonly held attitude partly dates back to negative experiences with propaganda broadcasting during the Nazi-regime, but it also is confirmed by more recent experiences in our own and in other countries: As broadcasting programs – to say it in the words of the German Constitutional Court – are not only a medium

German Constitutional Court – are not only a medium but also a factor of public opinion, the state is permanently seduced into abusing broadcasting with the intent of intervening politically. Especially when votes become scarce, politicians usually cannot resist this seduction.

For these reasons, the state is obliged to refrain from influencing broadcasters in Germany. There are politically independent boards, both for the regulation of private broadcasters and for the public control of public service broadcasters. Although the state sometimes tries to influence these boards, there are usually sufficient checks and balances to prevent this. The attention of socially relevant groups in society – especially of civil society – is held in esteem and integrated as a watchdog for the political independence of broadcasting. The control boards of public service broadcasters consequently recruit representatives from organizations of civil society, like churches, labor unions, employers' and consumer organizations, organizations of artists, local authorities and the like, in accordance with a formula laid down in the respective state broadcasting law or interstate broadcasting treaty. Also state parliaments depute a number of members (limited to roughly one third). As a result, the public service broadcasters are controlled neither by the market nor by the state, but by a hybrid mixture of non- or low-commercial bodies and non- or low-governmental bodies.

This mixture cannot be located in the bi-sector paradigm. It cannot be positioned anywhere on the axis of Figure 2, since a third institution, which exists alongside the market and the state, constitutes it: the voluntary sector (also called the "third sector"). Although many activities, like religious, social and cultural activities, local life and neighborhood, belong mainly to this sector (which also in many countries is equally important as the market and the state with regard to its economic product), most economic textbooks ignore this sector (in contrast to sociological textbooks, which usually concern themselves with it in greater detail).

The voluntary sector is based on intrinsic, non-profit motives of the actors being organized by means of non-market and non-governmental (but collective) rules of decision-making. As far as these activities are not purely private, but also have public effects, the elements of the voluntary sector are also called "civil society".

Also broadcasters run by citizens that voluntarily provide resources in kind or in cash have to be allocated to the voluntary sector in this very sense of a non-governmental non-profit sector. They are based on the citizens' belief that there are certain values or contents, e.g. of a political, religious, cultural, or educational nature, that should be communicated to the public with the intrinsic motive of promoting this communication by voluntary in-kind contributions (like editorial or organizational assistance) or in cash (donations). First and foremost they are based on the journalists' attempts to understand the social, political, and economic factors that determine public welfare, and on the drive to communicate their opinions to others. In Germany there are several broadcasters rooted in civil society. They are called "Bürgerrundfunk" (Citizens' Broadcasting). The Eng-

lish term which best describes it is "Community Broadcasting". These programs usually focus on the interests of citizens, mostly with regard to local and regional affairs; they are diverse, often grass-root-oriented, and usually critical about commercial companies and (local) governments. Most contributions are provided by non-professionals, voluntarily, i.e. without payment, and thus can be considered as private donations in-kind. The main motives to volunteer are the opportunity to learn professional journalism and to participate in public communication.

Figure 3:
State Broadcasting, Commercial Broadcasting, and Voluntary Broadcasting
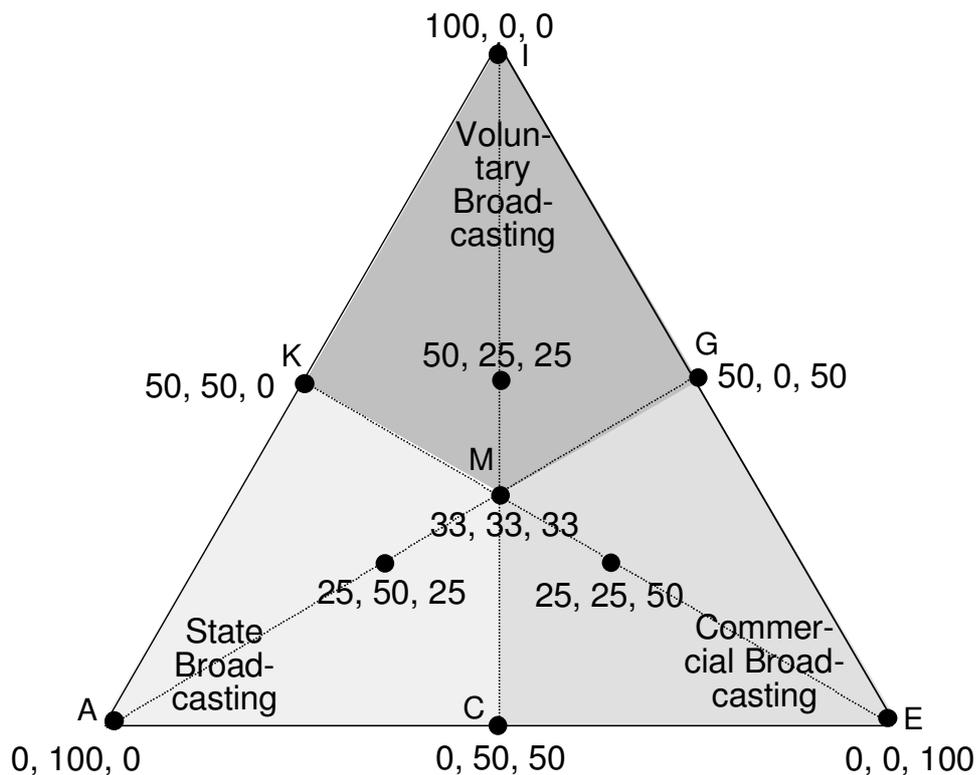
If one considers the voluntary sector as a third basic institution for the provision of goods in general and of broadcasting programs in particular, the one-dimensional space exposed in Figure 2 expands to a "magic triangle" (Figure 3).[1]

Broadcasters located in the corners of this triangle are funded solely by the state (A), the market (E), or the voluntary sector (I), respectively. In Section 2.4. we have labeled these broadcasters as "purely financed". The revenue vectors, i.e. the proportions by which the three sectors fund the broadcasters, consist in this case of only one component (=100 %); the two other components are empty (=0 %). As we have defined them, the revenue vectors' first component always indicates the proportion of voluntary sector funding, the second component always indicates the proportion of state funding, and the third component always indicates the proportion of market funding.

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[1] For details see KOPS 2007.

Two institutions jointly fund broadcasters that are located on the edges, i.e. between two corners of the triangle. In Section 2.2. we have labeled these broadcasters as "mixed financed". Broadcasters located on line AE, for instance, are funded by the state and the market (in Figure 3 Broadcaster C, located in the middle of this line, is funded to the same extent: 50 % by the state and 50 % by the market.). Broadcasters on line AI are funded by the state and the voluntary sector (in Figure 3 Broadcaster K, located in the middle of this line, is equally funded 50 % by the state and 50 % by the voluntary sector.). And broadcasters on line IE are funded by the voluntary sector and the market (in Figure 3 Broadcaster G, located in the middle of this line, is funded with 50 % by the voluntary sector and with 50 % by the market.).

Broadcasters that are located inside the triangle, are funded by all three sectors. According to our typology in Section 2.2. these broadcasters are also "mixed funded". Broadcaster M, for example, located in the middle of the triangle, is funded to the same extent: 33.3 % by the state, 33.3 % by the market, and 33.3 % by the voluntary sector.[1] Other revenue vectors mentioned in figure 3 are 50 %, 25 %, 25 %, and 25 %, 50 %, 25 %, and 25 %, 25 %, 50 %.

3.2. A Revenue Based Distinction
between Three Types of "Pure" Broadcasters
and Seven Types of "Mixed" Broadcasters

A more detailed classification is shown in Figure 4. Here a system is classified as "pure", if the dominating type of funding exceeds 50 % of the total budget (i.e. the other two types of resources together attribute less than 50 % to the total budget). In this classification a broadcaster is thus classified as a:

a) "*Pure state broadcaster*" if the state revenues exceed 50 % of the total revenues (in Figure 4 this type is located inside the rhombus ABNL),

b) "*Pure commercial broadcaster*" if the market revenues exceed 50 % of the total revenues (rhombus EFPD),

c) "*Pure voluntary broadcaster*" if voluntary revenues exceed 50 % of the total revenues (rhombus IJRH).

d) *Equally balanced mixed broadcasters (*in Figure 4 this type is located inside the inner triangle NPR)*. Here the state, the market and the voluntary sector all contribute approximately one third to the total budget. Minimal deviations from equal shares are allowed, but all sectors must contribute at least 25 % to the total budget.

e) *"State influenced voluntary broadcasters"* (JKSR) are predominantly financed by voluntary donations, but also receive state revenues, like taxes, state grants or license fees. *Public service broadcasters* also belong to this type, as they depend on the state's decision to grant them state revenues or

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[1] For simplicity's sake, revenue shares in this paper are always rounded off to zero positions behind the decimal points.

to provide them with their own public revenue source (e.g. the license fee, or a supplement to the state's resources from electricity, telephone or the like) and to enforce the collection of this public revenue source. The particularities of whether such broadcasters are nonetheless relatively independent from the state depend on the specific laws and the political culture of the country in question, as is the case in Germany, where the amount of the license fee is determined by an independent commission, or whether they are extremely dependent on the state or not. In the latter case they would have to be classified as:

f) *"NGO-influenced state broadcasters" (KLNS).* For this type the state's influence is either dominant due to direct political directives or due to the "golden tie" that exists, if no transparent, jurisdictional and enforceable rules determine how much revenue the state has to spend on the broadcasters. Also a broadcaster that receives a discretionarily paid license fee may fall into this category, even if it is labeled as an "independent broadcaster" or as a "public service broadcaster".

Figure 4:
A Geometric Exposition of the Revenue Structure of Broadcasters, Distinguishing Three "Pure" Forms and Seven "Mixed" Forms of Financing
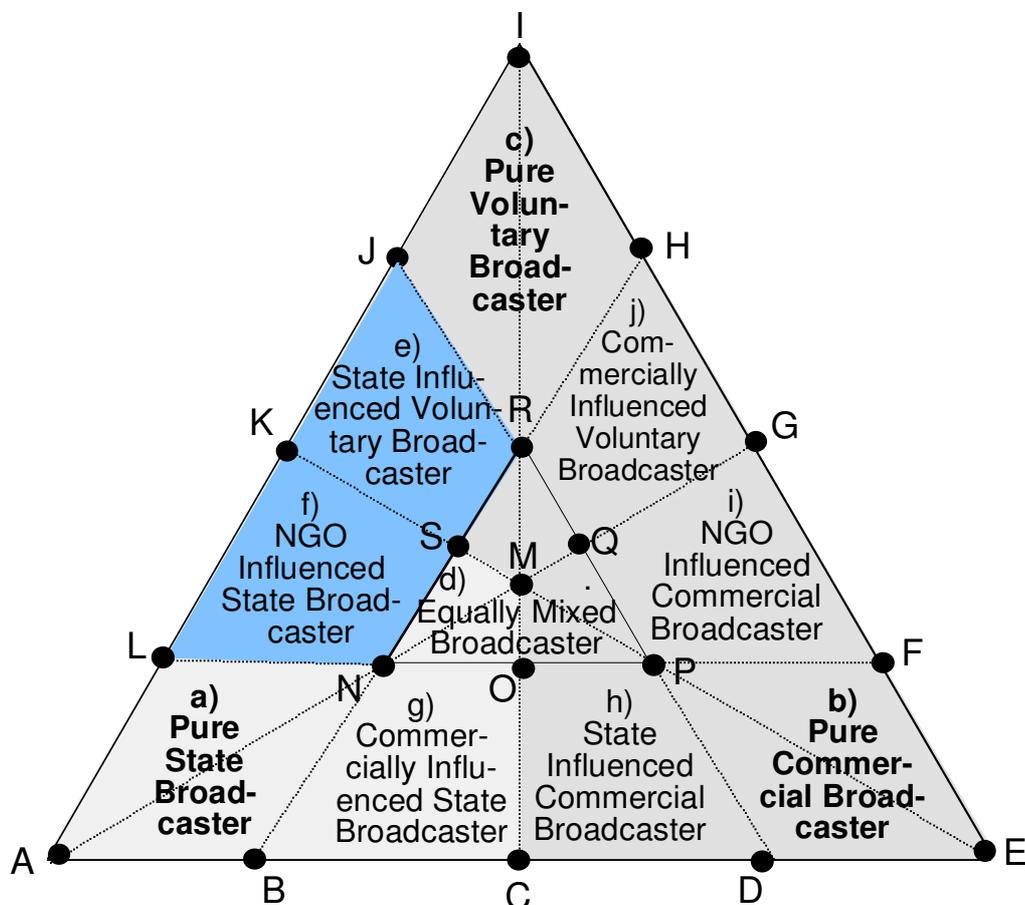
In addition to these types of "pure" broadcasters (or better: of broadcasters that are dominantly financed by only one type of revenue), in Figure 4 seven types of "mixed" broadcasters are distinguished:

g) *"Commercially influenced state broadcasters" (BCON)* are dominated by the state, but also in addition the market (i.e. private companies) has a limited influence. One reason may be that a greater portion of the broadcasters´ revenues stems from the market; in this case the broadcasters are forced to obey market rules in order to receive these revenues. Another reason may be the connection between political and economic interests, which is only seldom visible (e.g. if politicians own private media corporations or if media owners possess political positions). In this regard broadcasters that are financed solely by state revenues may indirectly be steered by private companies to a large extent (and thus should be classified as "commercially influenced state broadcasters" or even as "state influenced commercial broadcasters", see below). On the other hand there may also be broadcasters that are financed solely through market revenues, but are still dependent on the state (e.g. if the state establishes and defeats their monopolistic market positions by prohibiting new market entries).

h) *"State influenced commercial broadcasters"* (CDPO). Here the market dominates, but the state also has a certain influence, either because a considerable portion of total revenues stems from taxes or state grants or because an indirect influence from the state exists, which was mentioned above (and predominates) for Type f (and which in comparison to Type f is of less importance here).

i) *"NGO influenced commercial broadcasters"* (FGQP). Here the market also dominates, but NGOs have a certain influence, either because they spend a considerable amount on donations or because they have other ways to make their voice heard by the broadcasters. Some countries for instance empower certain NGOs (like labor unions, churches, consumer organizations) by law to participate in programming or at least to systematically observe and evaluate broadcasting programs. In other countries there are at the very least informal ways of lobbying and networking, through which NGOs can influence the broadcasters' programming decisions and program contents.

j) *"Commercially influenced voluntary broadcasters"* (GHRQ). In addition to donations, these broadcasters either receive a considerable portion of market revenues, or they are influenced considerably by indirect influences of the market, e.g. when subsidies are given by private companies only under the (often unexpressed) condition that the broadcasters promote the companies' products or at least renounce all actions that could impede the companies' success.

3.3. Public Service Broadcasting –
a Hybrid System between the State and Civil Society

According to our typology, public service broadcasters are not a pure type. Thus they do not appear in Figure 3, which only distinguishes between state broadcasters, market broadcasters and voluntary broadcasters. Nor do they appear in Figure 4, which in addition to these pure types, distinguishes between seven mixed types.

However, it is possible to locate public service broadcasters in our typology. In order to do so, we have to recall the above-mentioned weaknesses of pure voluntary broadcasters. Experiences in Germany – as well as in other countries – have shown that in general such voluntary broadcasters are not able to provide high quality programs of a sufficiently broad range. Even in countries where the citizens realize and highly appreciate the benefits of independent broadcasters, there are too few donations. Therefore these broadcasters are usually hooked on revenues from the market and/or from the state. The German Citizens' Broadcasters for instance receive some donations in-kind from private companies, e.g. for technical equipment, and the "Landesmedienanstalten" (the German regulatory authorities for private broadcasters) also provide financial grants. A small part also stems from market revenues, e.g. from program sales, but not from commercials (which Citizens' Broadcasters are not allowed to broadcast in Germany).[1]

Compared to voluntary broadcasters, public service broadcasters may yield higher market revenues, as long as commercial pressures do not jeopardize its public programming mission. In most countries they thus are allowed to broadcast commercials within certain limits, to perform sponsoring and merchandising, or to re-sell programs. Also the state is often an important indirect donor, allowing public service broadcasters to yield a license fee and providing them (or an institution that is authorized by them) with the legal and organizational remedies to enforce the collection of this fee. Hence in practice the "voluntary" broadcasters from civil society also combine elements of the voluntary sector with elements of the state (e.g. the state's power to enforce public revenues) and with elements of the market. This makes them a "hybrid" or "mixed" system.

Figure 4 illustrates this: Public service broadcasting is located in the area JRNL (the blue area). In this area there is an influence both from the market and from the state (with regard to the financial incentives: there are revenues). But this influence remains restricted in comparison with "pure commercial broadcasters" (area PFED) and "pure state broadcasters" (area LNBA). As sub-types of public service broadcasters "state-influenced voluntary broadcasters" (JRSK), which

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[1] For details of the revenue structure of the German Citizen Broadcasters see KOPS 2007.

are located inside the voluntary sector (inside the civil society) and "NGO influenced state broadcasters", can then be distinguished.[1]

The position of public service broadcasters near the upper corner of the triangle illustrates that the members of civil society are the allies of public service broadcasters. They try to organize a society by non-governmental non-profit rules, similar to public service broadcasters; and they need public service broadcasters as capable shareholders of civil societies' targets. This constitutes a reciprocal responsibility: Public service broadcasting has to lend its voice to civil society, especially when the institutions of civil society are threatened, and the institutions of civil society have to support public service broadcasting – including a benevolent critical control if public service broadcasters disregard their mission, e.g. by serving state interests or by commercializing themselves.

The location of public service broadcasting inside the civil society, as shown in Figure 4, also illustrates that it is endangered by two poles: by its market partners that pursue their own commercial interests, and by the state that tries to settle and secure its power by means of the mass media. Thus there is a two-fold risk that the public service elements are crowded out, either by characteristics of state power (and state control) or by market power (and market control). In this regard, public service broadcasters must seek proximity to the market and proximity to the state in order to gain the resources necessary for its mission, but at the same time they must keep sufficient distance from both poles – a task that is equally complicated as Odysseus' passage between Scylla and Charybdis.

By means of the described typology it becomes possible to compare a broadcaster's funding structure (and the program output generated by its funding incentives) over time. And it becomes possible to compare several broadcasters within a national broadcasting system or internationally. The typology also can be used to determine empirically the actual funding structure of a broadcaster (or a group of broadcasters = a broadcasting system) with a structure that is preferred normatively, and to point out the direction and strength (or pace) which is necessary to match the positive with the normative order. [2]

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[1] A narrow definition of public service broadcasters would only include the first of these sub-types. In reality, however, in many countries the stations that are labelled as "public service broadcasters" fall into the second sub-type (according to our typology some even would have to be classified as "pure state broadcasters").

[2] See KOPS 2007 for details.

4. Generating Graphs for the Exposition
of Broadcasting Systems by Means of Microsoft Excel

For the data collection and graphical exposition of materially existing broadcasting systems electronic spreadsheets can be used. In this paper we provide a spreadsheet, in Excel called "Workbook", generated with Microsoft's Excel 2003. It can be downloaded from www.rundfunk-institut.uni-koeln.de/institut/publikationen/ arbeitspapiere/ap231e.xls. As displayed in Figure 5 this Workbook contains three worksheets: "Data Input", where the raw data are inserted and eventually reallocated (see Section 4.1), "Data Processing", where all computations are conducted (see Section 4.2.), and "Data Output", where the results are diagrammed (see Section 4.3).

Figure 5:
The Workbook Structure
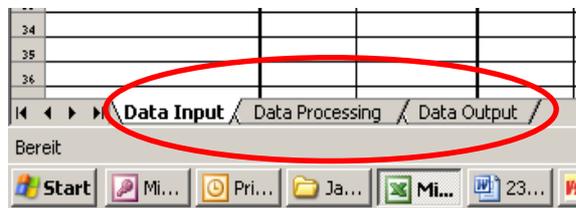
4.1. Inserting and Reallocating the Basic Data

By means of the worksheet "Data Input" data for a maxim of 200 broadcasters can be inserted. The data of the first 40 of these broadcasters can be visualized by means of a graph "Exposition by Broadcasters" (see Section 4.3, Figure 10). The limit of 40 is reasonable as it is not possible to represent a larger number of broadcasters without too many overlaps. However, this limit neither affects the graph "Exposition by Groups of Broadcasters" (see Section 4.3, Figure 12) nor the exposition of data in the table "Exposition by Broadcasters" (in the worksheet "Data Output").

In order to ensure that the data are processed properly, different cells of the "Data Input" worksheet have to be filled out. They belong to the following (areas of) columns: "Broadcasters' Name", "Broadcasters' Revenues", "Reallocation of Mixed Revenues of a Broadcaster in % (from original sector/to final sector)" (if revenues have to be reallocated) and "Assignment of a Broadcaster to a Group" (if certain broadcasters shall be grouped and the group results be exposed graphically).

In the spreadsheet area "*Broadcasters' Revenues*" the revenues for each broadcaster have to be assigned to the state, the market and the voluntary sector, respectively. This generates the broadcasters' (basic) revenue vectors that determine its location inside the magic triangle. Only data from pure revenues should be entered here, which can be used for the graphical representations without any corrections. They have to be entered into the columns "Pure Voluntary Sector Revenues", "Pure State Sector Revenues" and "Pure Market Sector Revenues"; in the Excel table shown in Figure 6 these are the Columns B, D and F.

Figure 6:
Worksheet "Data Input"

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
			Broadcasters' Revenues					Reallocation of Mixed Revenues of a Broadcaster in % (from original sector / to final sector)									Divide through data in the column below / Population of a country or absolute number of viewers/listeners/users
2	Broad-casters' Name	Pure Volun-tary Sector Reve-nues	Mixed Voluntary Sector Revenues (can be reallo-cated)	Pure State Sector Reve-nues	Mixed State Sector Revenues (can be reallo-cated)	Pure Market Sector Reve-nues	Mixed Market Sector Revenues (can be reallo-cated)	Volun-tary/ State	Volun-tary/ Market	State/ Volun-tary	State/ Market	Market/ State	Market/ Voluntary	Total Revenues of Each Broadcaster (calculated automatically)	Groups of Broadcas-ters	Assign-ment to a Group	
3	ARD		5,093.7			955.1		33.33						6,048.8	PSB	PSB ▶	
4	ZDF		1,575.5			272.8		33.33						1,848.3	COM	PSB ▶	
5	DLR		192.8	4.4		16		33.33						246.53	CB	PSB ▶	
6	DW				301.9	11.7				40				313.6	DW	DW ▶	
7	Citizens Broad-casting	60	15	5		10		33.33						123.33		CB ▶	
8	RTL–Group					3,249.5								3,249.5		COM ▶	
9	Pro7Sat1-Group					2,593.2								2,593.2		COM ▶	
10	Other Commer-cials					897.9								897.9		COM ▶	
11																▶	
12																▶	
13	...														GER Total	▶	

If broadcasters are funded by revenues that are mixtures themselves (in Chapter 3, above, the license fee was mentioned as the most prominent form of such a type of mixed revenues, consisting both of state elements and civil society element), the data have to be entered into the columns "Mixed Voluntary Sector Revenues", "Mixed State Sector Revenues", and "Mixed Market Sector Revenues". In the Excel table shown in Figure 6 these are the Columns C, E and G, respectively. From there they then can be reallocated to other sectors via the column area "Reallocation of Mixed Revenues of a Broadcaster in % (from original sector/to final sector)"; in Figure 6 these are the Columns H to M). The reallocation is conducted by inserting a correction factor *between 0 and 100* in the respective cell. The sum of the correction factors of the sector revenues for each broadcaster may not exceed 100 %.

In the column "Total Revenues of Each Broadcaster" (Column N in Figure 6) the different revenues will be summarized automatically (as mentioned, the sum has to add up to 100 %). Cells in this column cannot be edited, but serve for control purposes only.

In the column "Assignment to a Group" (Column P in Figure 6) the revenues of a broadcaster can be assigned to a group: e.g. all public service broadcasters of a country can be assigned to a group "PSB", all commercial broadcasters of a media group can be assigned to a "Media Group XYZ", etc. Similarly, different groups of commercial or public broadcasters can be created, e. g. all broadcasters located in the southern part of a county versus all broadcasters within the northern part, or all commercial broadcasters that belong to a certain media group (in Germany e.g. to the Bertelsmann group). This allocation determines the graph "Exposition by Groups of Broadcasters" (see Section 4.3, especially Figure 12). For this purpose the groups' names, including "Total" broadcaster's revenues (max. 10+1), have to be defined in the column "Groups of Broadcasters" (light blue shaded cells in Column O in Figure 6).

In order to compare broadcasters and broadcasting systems from different countries one can insert additional data that transforms absolute numbers into relative numbers or percentages. For instance, the broadcasters' absolute revenues can be divided by the total revenues of all broadcasters, by a countries' total population or by a countries' total number of viewers, listeners or users. For this purpose these data have to be entered into the respective cells of the column (Column Q in Figure 6), and the "check button" in the first cell of this column (Cell Q1) has to be activated.[1]

In Figure 6 we have used the data from the German broadcasting system as an illustration (see KOPS 2007, pp. 42 - 46, there especially Table 7). In the first

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[1] As the new data will only have impact on the size ratio between the broadcasters it can be shown solely graphically. As the graphical exposition is restricted to 40 broadcasters, these additional data also should be entered for the first 40 broadcasters only. Data entered for the 41st-200th broadcaster will not be taken into consideration.

step the "pure revenues" are entered: Firstly, 60 M € of donations/civil society revenues (into Cell B7 of Figure 6) that go to the Citizen Broadcasters, 4.4 M € and 5 M € of state revenues that go to DLR (into Cell D5) and to the Citizen Broadcasters (into Cell D7), and secondly pure market revenues of 955.1 M €, 272.8 M €, 16 M €, 11.7 mill €, 10 M €, 3,249.5 M, 2,593.2 M € and 897.9 M € that go to all German broadcasters (into Cells F3 - F10).

All other revenues are "mixed revenues". They have to be treated as a type of "pure revenues" in a first step, but then have to be partly reallocated. In our example from the German broadcasting system this applies to the license fee that goes to all German Public Service Broadcasters (ARD, ZDF and DLR) and to the German Citizen Broadcasters. As these revenues are considered as a mixture of state revenue and Civil Society revenue (see our example from KOPS 2007), it has to be entered into the most appropriate basic revenue type of the Excel table in a first step, and parts of it then have to be reallocated to the other pure types in a second step. As we consider two thirds of the license fee as civil society revenue and one third as state revenue, we in a first step assign the complete revenues from the license fee to the voluntary sector, and then we reassign one third of it to the state sector (by entering a correction factor of 33.33 % into the cells H3 - H5 and H7). For the Deutsche Welle (DW) we reassign 40 % of the state revenues to the voluntary sector by inserting a "40" into the column "State/Voluntary" (Cell J6). The concrete numbers for reallocated revenues in our example are displayed in the Columns E, H and K in Figure 7). The revenues of the commercial broadcasters need not to be reallocated.

In the third step the different broadcasters have to be grouped. For this purpose in Column O (Figure 6) the group labels "PSB" for public service broadcasters, "COM" for commercial broadcasters, "CB" for Citizen Broadcasters and "DW" for the "Deutsche Welle" are entered. The dropdown-boxes in the cells of Column P can be used to assign each broadcaster to the appropriate group. In our example, ARD, ZDF and DLR can be allocated to the group "PSB"; DW and CB can be allocated to the respective group names (although this is redundant for these two broadcasters); and RTL, Pro7-Sat.1 and the other commercial broadcaster can be allocated to the group "COM".[1]

4.2. Data Processing

Data processing takes place only in the worksheet "Data Processing" (readers who are not interested in technical details may skip this section). This worksheet consists of three different tables: 1. the "Basic Table", where the revenue vectors are processed and eventually modified, 2. the "Computation by Broadcasters Table", and 3. the "Computation by Groups of Broadcasters Table".

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[1] The feature "dividing through the data in the column below" was not used in this example. If it were used, the overall population or the overall number of viewers/listeners/ users would have to be entered into the appropriate cells of the worksheet (in Figure 6 into the appropriate cells of Column Q).

4.2.1. Description of the "Basic Table"

Based on the data that has been entered into the worksheet "Data Input", in the "Basic Table" the following computations are conducted (see Figure 7):

a) In the grey shaded columns the corrected revenues are computed for each sector and each broadcaster. The method can be demonstrated by means of the formula in Cell E3 in Figure 7 (Column E: "Corrected Voluntary Sector Revenues"; Broadcaster Number 1, in our example the broadcaster "ARD"). This formula is used with respective adjustments in all other cells of the Columns E, H and K, too.

   i. Firstly the pure voluntary sector revenues (Cell C3) and the mixed voluntary sector revenues (Cell D3) of the first broadcaster are summed up (in Cell E): in our example 0 + 5,093.7 = 5,093.7.

   ii. Secondly the revenues are included that had already been reallocated from the state sector and the market sector to the voluntary sector within the worksheet "Data Input". For this purpose the "mixed revenues" of these sectors (Cells G3 and J3) are multiplied with the relevant correction factors (Cells P3 and S3) and 0.01:[1] 0.01*(P3*G3 + S3*J3) = 0.01*(0*0 + 0*0) = 0.

   iii. Thirdly the revenues allocated from the mixed voluntary sector (D3) to the state and market sectors have to be subtracted, and then each multiplied with the relevant correction factor (Cells N3 and O3) and 0.01:
   0.01*(-N3*D3 − O3*D3) = 0.01*(-33.33*5,093.7 − 0*5,093.7) = -1,697.7

   After merging the three parts we arrive at:
   E3= C3 + D3 + 0.01*(P3*G3 + S3*J3 − N3*D3 − O3*D3) =
   5,093.7 + 0 − 1,697,7 = 3,396.0 M €.

b) The market share of each broadcaster is calculated as a ratio of the respective broadcasters' revenues to the sum revenues for all broadcasters: e.g. the "ARD's" market share would be the division of its revenues through the revenues of all German broadcasters: 6048.8/15299.5 = 0.40 (the corresponding formula in Cell T3 is L3/203; see Figure 7).

c) In Figure 6 revenue vectors for each broadcaster will be calculated, which represent the relative share of each revenue type (sector) of a particular broadcaster, e.g. in Cell U3=IF(E3=0; 0; E3/L3). The core of this formula is the quotient E3/L3, in example numbers: the "ARD's" voluntary revenue vector is 3396.0 / 6048.8 = 56.1 %. The IF-condition is necessary here to avoid the error message in case of a division through zero. The same method is also used in some other calculations.

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[1] Multiplying the formula above with 0.01 is necessary as for easier input the correction factor is defined between 0 and 100.

Figure 7:
The "Basic Table" (as Part of the Worksheet "Data Processing")

1. Basic Table

	A	B	C	D	E	F	G	H	I	J	K	L	M	Reallocation of Mixed Revenues of a Broadcaster in % (from origin / to destination sector)						T	Revenue-Vectors			
	Num-ber	Broad-casters' Name	Pure Vo-luntary Sector Rev.	Mixed Volun-tary Sector Rev.	Corr. Volun-tary Sector Rev.	Pure State Sec-tor Rev.	Mixed State Sector Rev.	Corr. State Sector Rev.	Pure Market Sector Rev.	Mixed Mar-ket Sector Rev.	Corr. Market Sector Rev.	Total Rev.s of Each Broad-caster	As-sign-ment to a Group	N Vo-lun-tary/ State Mar-ket	O Vo-lun-tary/ Mar-ket	P Sta-te/ Vo-lun-tary Mar-ket	Q Sta-te/ Mar-ket	R Mar-ket/ Sta-te	S Mar-ket/ Vo-lun-tary	"Market Share" of Each Broad-caster	U % Volun-tary Sector Rev.	V % State Sector Rev.	W % Market Sector Rev.	X % Total
3	1.	ARD	0	5,093.7	3,396.0	0	0	1,697.7	955.1	0	955.1	6,048.8	1	33.33	0	0	0	0	0	0.40	56.1%	28.1%	15.8%	100%
4	2.	ZDF	0	1,575.5	1,050.4	0	0	525.1	272.8	0	272.8	1,848.3	1	33.33	0	0	0	0	0	0.12	56.8%	28.4%	14.8%	100%
5	3.	DRL	0	192.8	128.5	4.4	0	68.7	16	0	16	213.2	1	33.33	0	0	0	0	0	0.014	60.3%	32.2%	7.5%	100%
6	4.	DW	0	0	120.8	0	301.9	181.1	11.7	0	11.7	313.6	4	0	0	40	0	0	0	0.02	38.5%	57.8%	3.7%	100%
7	5.	Citizens Broad-casting	60	60	100.0	5	0	25.0	10	0	10	135	3	33.33	0	0	0	0	0	0.01	74.1%	18.5%	7.4%	100%
8	6.	RTL-Group	0	0	0	0	0	0	3,249.5	0	3,249.5	3,249.5	2	0	0	0	0	0	0	0.21	0.0%	0.0%	100.0%	100%
9	7.	Pro7Sat1-Group	0	0	0	0	0	0	2,593.2	0	2,593.2	2,593.2	2	0	0	0	0	0	0	0.17	0.0%	0.0%	100.0%	100%
10	8.	Other Com-mercials	0	0	0	0	0	0	897.9	0	897.9	897.9	2	0	0	0	0	0	0	0.06	0.0%	0.0%	100.0%	100%
11-202	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	...	...
203		Total	60	6,922.0	4,795.7	9.4	301.9	2,497.6	8,006.2	0	8,006.2	15,299.5									31.3%	16.3%	52.3%	100%

d) Some peculiarities result from the feature that allows the computing of relative revenue shares instead of absolute revenues (e.g. by dividing the broadcasters' revenues by the countries' populations, see Section 4.1.). In this case the formula for the broadcasters' revenues – pure as well as mixed – for data sets of the 1st to 40th broadcaster have to be divided through the respective sums.[1]

4.2.2. Description of the Table "Computation by Broadcasters"

Revenue vectors from the "Basic Table" (Columns U, V and W in Figure 6) are automatically transferred to the Columns AB, AC, and AD of the table "Computation by Broadcasters" (see Figure 8); and then are multiplied by 100 (this is necessary for further calculations). This converts them into the x, y coordinates, which are needed for the final graphical exposition (see Columns AE, AF and AG in Figure 8).

Figure 8:
The Table "Computation by Broadcasters"
(as Part of the Worksheet "Data Processing")

	Z	AA	AB	AC	AD	AE	AF	AG
1	2. Computation by Broadcasters							
2	Number	Name for the Exposition	Voluntary Sector Revenues	State Sector Revenues	Market Sector Revenues	X	Y	Surface Coefficient
3	1.	ARD	56.14	28.07	15.79	4.38613427	4.86197236	1
4	2.	ZDF	56.83	28.41	14.76	4.31744265	4.92146376	0.30556474
5	3.	DRL	60.29	32.20	7.51	3.76500375	5.22117412	0.03524666
6	4.	DW	38.51	57.76	3.73	2.29846939	3.33476276	0.05184499
7	5.	Citizens Broadcasting	74.078	18.52	7.41	4.44451852	6.41494311	0.02231848
8	6.	RTL-Group	0	0	100	10	0	0.53721399
9	7.	Pro7Sat1-Group	0	0	100	10	0	0.42871313
10	8.	Other Commercials	0	0	100	10	0	0.14844267
11-42	…	…	…	…	…	…	…	…

These steps require a geometrical deduction of an equilateral triangle, as it has been introduced as a "magic triangle" in this working paper (see e.g. Figure 3).

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[1] The formula in the Cell C3 (see Figure 7) will be taken as an example:

IF('Data Input'!Q3<>0;IF('Data Input'!Q1=TRUE;
'Data Input'!B3/'Data Input'!Q3;'Data Input'!B3);'Data Input'!B3).

It says that if the cell of column "Population of a country …" ("Data Input") contains data and the respective check button is on ('Data Input'!Q1=TRUE), than it shall display the result of the ratio of the cells B3 and Q3 (both from "Data Input"; see Figure 6). In other case the actual content of Cell B3 shall be portrayed. For the sum of sector revenues, e.g. Cell C203 (see Figure 7) = IF('Data Input'!Q1=TRUE;SUM(C3:C43); SUM(C3:C202)), then it has to be taken into account that if this feature is in use, only the sum of the first 40 broadcasters may be considered.

For this triangle we use a standardised length of 10 cm for each side. To recreate the sides in a coordinate system we need three linear functions of the form y = a*x + b. Hence, for each of the three functions we have to find the parameters a and b. The side "State-Market" equals the abscissa, i.e. the (x) axis. Due to its progression the parameters a and b are 0, as well as the whole function y_{SM}=0.[1] The parameter b of the function, representing the side "State-Voluntary" is 0, as it stems from the origin of the coordinate system. To determine the parameter a (the slope of the function) we need to find the x, y coordinates of the "Voluntary" corner. If by means of the bisecting line through the "Voluntary" corner" we divide the triangle into two identical right-angled triangles, for the left triangle we get the corner coordinates (0;0), (5;0) and (5;u).[2] The length of the cathetus A (0;0, 5;0) is 5 cm long and the hypotenuse is (0;0, 5;u) = 10 cm long. We can apply Pythagoras' theorem here, expressed through the formula $a^2 + b^2 = c^2$. Applying our numbers to this formula results in $u^2 + 5^2 = 10^2 \Leftrightarrow u^2 = 100 - 25 \Leftrightarrow$ u ≈ 8.66. Thus, the length of the second cathetus B is 8.66 cm. As one point of the cathetus B lies on the abscissa axis (5;0), and the cathetus goes upwards orthogonal to the abscissa, we can conclude that the "Voluntary"-corner has the coordinates (5; 8.66). For the deduction of the linear function, which represents the side "State-Voluntary", we insert concrete numbers into the function y = ax + b: 8.66 = a*5 + 0 ⇔ a = 1.732. The function we are looking for is thus y_{SV} = 1.732x.

The "Voluntary-Market"-line is located opposite of the "State-Voluntary"-line. Its linear function has the same slope coefficient as the "State-Voluntary"-line, except that it has the opposite algebraic sign, that is a = -1.732. We now need to find parameter b. We know that the "Market" corner has the coordinates (10;0), as this point lies on the abscissa axis (y = 0). When we use concrete numbers for the function y = ax + b, we receive 0 = -1.732*10 + b. After dissolving the equation we get b = 17.32. The complete function thus is y_{VM} = -1.732x + 17.32.

The functions that recreate the triangles' sides at the same time define the extreme values of the revenue vectors. For instance, all points with the market vector 0 ($y_{(M=0)} = y_{SV} = 1.732x$) are located on the line "State-Voluntary", because it is the furthest away from the "Market" corner. In other words, all broadcasters that are situated exactly on this line receive no market revenues. If we move this line parallel to the "Market" corner subtending it until all points that are located on this line will represent the market vector of 100 (even if they are valid only in the intersection point because the rest of the line is located outside the triangle). The new (moved) function has the same slope as the opposed triangle side (same parameter a), however it does no longer cross the origin but the point (10;0). To determine b of the new function, which previously was 0, we need to resolve our standard equation (y = a*x + b) for b using new numbers (x=10, y=0, a=1.732): 0 = 1.732*10 + b ⇔ b = -17.32. Thus the function, which recreates the market vector of 100 is $y_{(M=100)}$ = 1.732x - 17.32. Market vectors lying between these two

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[1]   The State is abbreviated by S, the voluntary sector by V and market by M.

[2]   U as the abbreviation for "unknown".

extremes can be determined by variation of the parameter b, depending on the market vector (let us call it z_M). Such an interpolation function is: y = 1.732x - z_M*17.32*0.01. Thus, each concrete market vector has an individual function, e.g. for z_M = 0 the function is y = 1.732x; for z_M = 100 it is y=1.732x -17.32.

Similarly we can deduct the interpolation function for the state sector from the function that defines the "Voluntary-Market" side: y_{VM} = -1.732 x + 17.32. As for z_S =0 (state vector = 0) the parameter "b" is 17.32 and for z_S =100 "b" is 0, we need to use the term (100-z_S) to reproduce the reverse behaviour of the function. The interpolated function is y =-1.732 x + (100 - z_S)*0.01*17.32.

Table 1:
Determination of Interpolated Functions "y"

Sectors	Functions representing extreme values of revenue vectors (z)		Interpolated functions (y) for z [0;100]
	z=0	z=100	
Voluntary	$y_{(V=0)} = y_{SM} = 0$	$y_{(V=100)}$ = 8.66	y=z_V *0.01*8.66
State	$y_{(S=0)} = y_{VM} = -1.732\ x + 17.32$	$y_{(S=100)} = -1.732\ x$	y=-1.732 x + (100 - z_S)* 0.01*17.32
Market	$y_{(M=0)} = y_{SV} = 1.732\ x$	$Y_{(M=100)} = 1.732\ x\ -\ 17.32$	y=1.732 x - z_M * 0.01 * 17.32

The definitions of the interpolated functions y for the voluntary sector are quite simple as the z_V =0 (voluntary vector = 0) and z_V =100 are constants. The interpolation function therefore is y = z_V*0.01*8.66. In Table 1 all functions are summarized.

In the next step the x and y coordinates can be determined by means of an intersection point of at least two straight lines (a third line is not necessary as it would not change the results). Therefore we have to equate two interpolated functions. If we equate the functions for the state and market vectors, for instance, we arrive at:

-1.732 x + (100 - z_S)*0.01*17.32 = 1.732 x - z_M*0.01*17.32

$\Leftrightarrow$ x = 5 + 0.05*(z_M - z_S).[1]

We can compute the x coordinate of a point, if we insert the numbers of state and market vectors (z_S und z_M) into the formula above. To determine the corresponding y value, we put the x value in one of the two interpolated functions. To derive a general formula for the determination of the y value, we put in the "Market" function (y= 1.732 x - z_M*0.01*17.32) the x function above (x = 5 + 0.05* (z_M - z_S)) and resolve it: y = 8.66 - 0.0866*(z_S + z_M).

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[1] Intermediate steps:
$\Leftrightarrow$ -1.732 x + (100 - z_S)* 0.1732=1.732 x + z_M * (-0.1732)
$\Leftrightarrow$ -1.732 x – 1.732 x = z_M * (-0.1732) - (100 - z_S)* 0.1732
$\Leftrightarrow$ -3.464 x = -17.32 + 0.1732* (z_S - z_M) | : -3.464

In addition to the x and y coordinates of the dots we need to determine its sizes. This is achieved by means of the surface coefficients, which expose the differences between the broadcasters. If the budget of Broadcaster A is two times the budget of Broadcaster B, the surface of the dot that represents A should therefore be two times larger than the surface of the dot for B. To achieve this, a "relative surface coefficient" is calculated by dividing the revenues of each broadcaster through the revenues of the biggest broadcaster.

Figure 8 illustrates this: In Cell AG3 we receive the formula =L3/MAX (L3:L41), where Cell L3 (see Figure 6) represents the absolute revenues of the first broadcaster and the function MAX(L3:L41) calculates the revenues of the biggest broadcaster. The biggest broadcaster receives the surface coefficient 1, as a result of dividing the value by itself.

4.2.3. Description of the Table "Computation by Groups of Broadcasters"

If in the worksheet "Data Input" a broadcaster has been assigned to a group, its revenues will be part of the calculations in the table "Computation by Groups of Broadcasters" (see Figure 9). The revenues of a broadcaster then appear only in the relevant column area. In all other areas (or if a broadcaster has not been assigned to any group) they equal zero. If the "relativization feature" described in Section 4.1. is activated, only revenues of the first 40 broadcasters will be exposed.[1]

In the column area "Total", revenues of all groups will be summarized per sector. In the row "Total Revenues per Sector", sums for each column of this table (sector) will be generated (e.g. Cell AJ204). In the row "Vectors" (e.g. Cell AJ206) relative numbers will be calculated, based on the previous data. In the next step, x and y coordinates as well as the dot surface for each group and the sum will be calculated. The dot surface for the total revenues is always 1, thus no search for the biggest coefficient is necessary. In the last row of the table the program generates textual data for the graphical exposition by means of the function "Concatenate", which merges the rounded vectors and the broadcasters' names. In Figure 9 this is demonstrated for the merged cells AJ210-AL210 – "PSB 56, 28, 15".

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[1] This will be ensured by the formula included with appropriate adjustments in all revenue data cells from the 41st to 200th broadcaster of this table, e.g. in Cell AJ44= IF (M43=AJ2;IF('Data Input'!Q1=TRUE;0;E43);0), which means: If a broadcaster was assigned to group number 1, then examine if the check box for the "relativization feature" has been activated. In case of activation it will display zero, otherwise it will display the revenues for this broadcaster and sector.

Figure 9:
The Table "Computation by Groups of Broadcasters"
(as Part of the Worksheet "Data Processing")

	AI	AJ	AK	AL	AM-BM	BN	BO	BP
1	3. Computation by Groups of Broadcasters							
2	Number		1				Total	
3		Voluntary	State	Market		Voluntary	State	Market
4	1	3396.0	1697.7	955.1		3396.0	1697.7	955.1
5	2	1050.4	525.1	272.8		1050.4	525.1	272.8
6	3	128.5	68.6	16.0		128.5	68.6	16
7	4	0.0	0.0	0.0	…	120.8	181.1	11.7
8	5	0.0	0.0	0.0		100.0	25.0	10
9	6	0.0	0.0	0.0		0.0	0.0	3249.5
10	7	0.0	0.0	0.0		0,00	0.0	2593.2
11	8	0.0	0.0	0.0		0.0	0.0	897.9
12-203	…	…	…	…	…	…	…	…
204	Total Revenues per Sector	4574.9	2291.5	1243.9		4795.7	2497.6	8006.2
205	Total Revenues per Group	8110.3				15299.5		
206	Vectors	56.4	28.3	15.3		31.3	16.3	52.3
207	x (top) y (bottom)-	4.35			…	6.80		
208	coordinates	4.89				2.71		
209	Surface Coefficient	0.53				1		
210	Name of the Exposition	PSB 56, 28, 15				GER Total 31, 16, 52		

4.3. Generated Graphs and Data Tables

In the worksheet "Data Output" there are two tables and two charts. They are suitable for presentation purposes and can be copied with the clipboard function into other applications, e.g. into Microsoft Word. In the left table, "Exposition by Broadcasters", corrected and uncorrected revenues of particular broadcasters as well as their vectors are depicted. Uncorrected revenues are already known and can be imported from "Data Input". Corrected revenues (grey tagged column), together with the vectors, were calculated in "Data Processing" on the basis of the given correction factors and the uncorrected revenues. Based on the Excel's bubbles chart, the vectors and the relative size of particular broadcasters are graphically exposed on the right hand of the discussed table in the chart "Exposition by Broadcasters" (see Figure 10 as an example). As the commercial broadcasters (RTL, Pro7-Sat.1 Group and others) have the same revenue structures but different revenue amounts, they overlap each other: i.e. the light blue dot represents "Other commercials", the turquoise one represents Pro7-Sat1 Group, and the red one represents the biggest commercial broadcaster, the RTL Group (only a narrow strip can be seen here).

Figure 10:
Exposition by Broadcasters of the German Broadcasting System
(as Part of the Worksheet "Data Output")
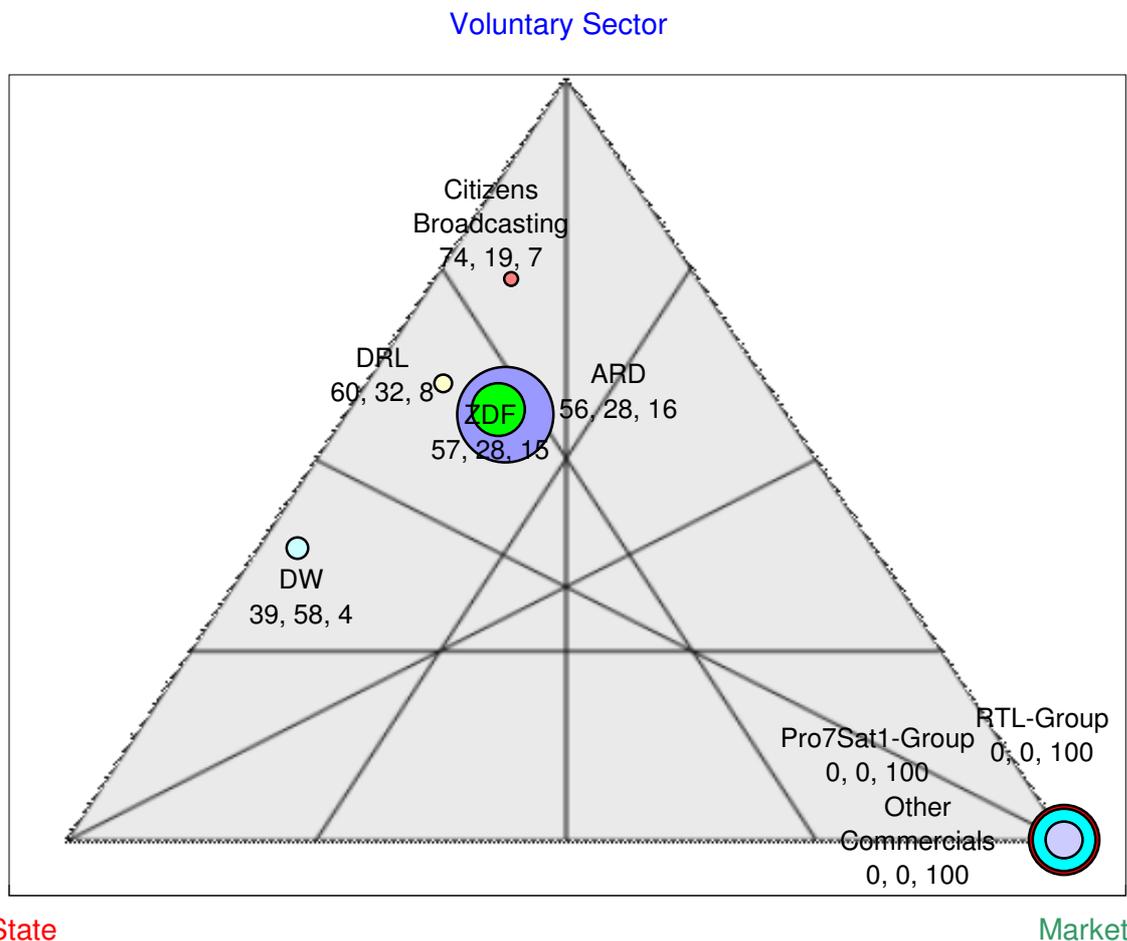
Figure 11:
The Table "Exposition by Groups of Broadcasters"
(as Part of the Worksheet "Data Output")

	Q	R	S	T	U	V	W	X	Y
1					Exposition by Groups of Broadcasters				
2	Groups	Voluntary Sector Rev.	Vectors of the Voluntary Sector Rev.	State Sector Rev.	Vectors of the State Sector Rev.	Market Sector Revenues of Each Group	Vectors of the Market Sector Revenues	Total Rev.	Vectors of the Total Rev. of Each Group
3	PSB	4574.9	56.4%	2291.5	28.3%	1243.9	15.3%	8110.3	100.0%
4	COM	0	0.0%	0	0.0%	6740.6	100.0%	6740.6	100.0%
5	CB	100.0	74.1%	25.0	18.5%	10	7.4%	135	100.0%
6	DW	120.8	38.5%	181.1	57.8%	11.7	3.7%	313.6	100.0%
7-12		…	…	…	…	…	…	…	…
13	GER Total	4795.7	31.3%	2497.6	16.3%	8006.2	52.3%	15299.5	100.0%

The right table "Exposition by Groups of Broadcasters" (see Figure 11) shows the revenues of broadcaster groups, as defined by the users. For the German broadcasting sector, for instance, we defined four groups: commercial (COM), public service (PSB), state (DW, as "Deutsche Welle" is the only state broad-

caster) and citizens broadcasters (CB). The table structure is similar to the table on the left (not shown here), but the uncorrected revenues are not taken into consideration. In the identically named chart on the right the revenues of groups will be exposed graphically (see Figure 12). The position of the German PSB sector is almost identical with that of "ARD" and "ZDF" (compare with figure 10). Totally identical are the positions of CB and DW, and also the positions of the commercial broadcasters (COM) all are the same. The dot representing the whole German broadcasting system (as a weighted average of the different elements of this system) is located between the dots of the public service broadcasters and the commercial broadcasters.

Figure 12:
Exposition by Groups of Broadcasters of the German Broadcasting System
(as Part of the Worksheet "Data Output")

Voluntary Sector

CB
74, 19, 7

PSB
56, 28, 15

DW
39, 58, 4

GER Total
31, 16, 52

COM
0, 0, 100

State   Market
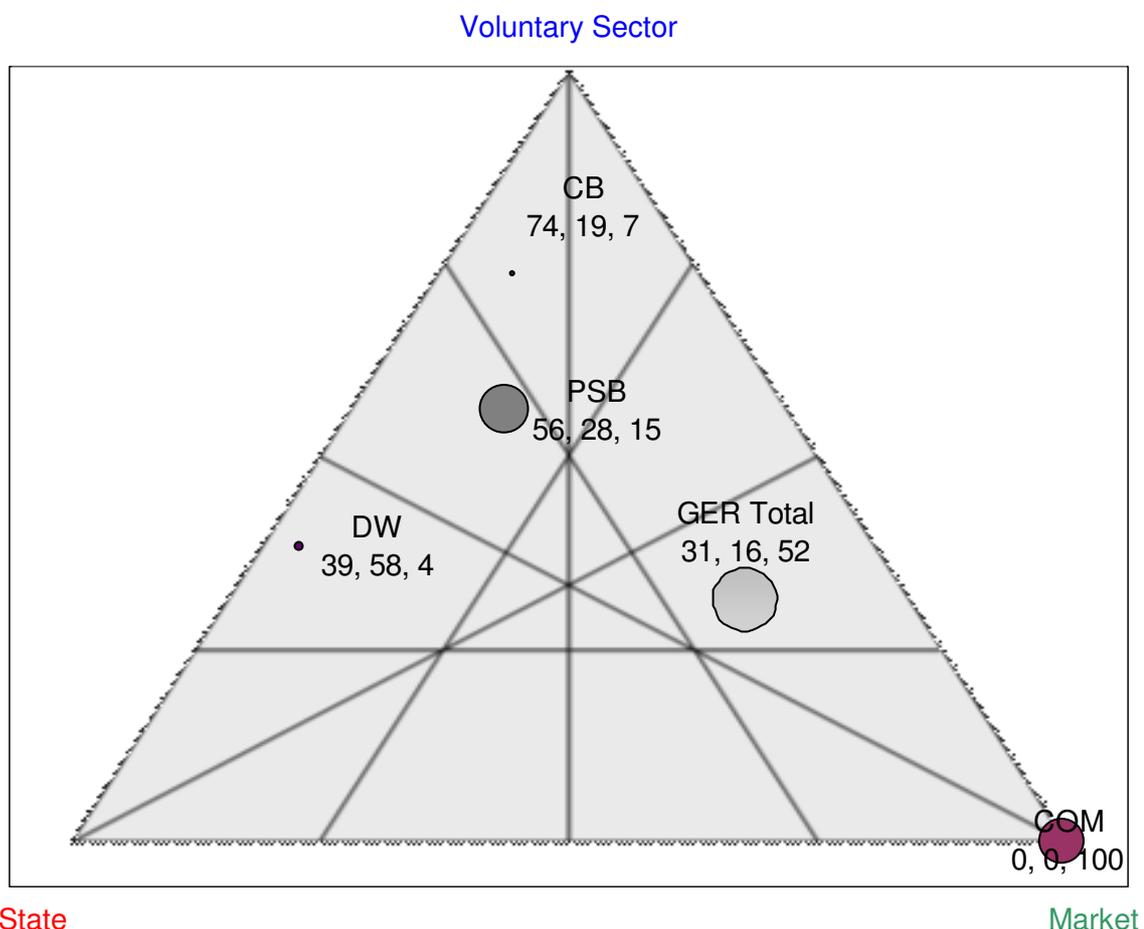
For both charts (Figures 10 and 12) the chart titles can be changed or even re-moved by right-clicking the respective chart and then choosing "Chart options" from the menu and subsequently the tab "Title".[1] The data legend of every dot

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[1] For more information on this topic see the corresponding Microsoft Excel 2003 Help Page at http://office.microsoft.com/en-us/excel/HP051984611033.aspx.

can also be edited: One can change its position, the font type and the size by right-clicking a data legend and choosing "format data series" from the menu.[1] If there is a plurality of data sets, it is often difficult to determine which data legend belongs to which dot. This can be found out by left clicking once on the respective dot: the name then will be displayed automatically. Moreover, the chart "Exposition by Broadcasters" can be edited by clicking in the check box to the left of the chart (see Figure 13); then near the broadcasters' names and the corresponding revenue vectors will be shown (like in Figure 10).

One can also determine the color of each dot (right mouse click on the relevant dot/"Format data series"/Tab "Patterns"/Choose the desired color). In the tab "Options" defining a multiplier between 0 and 300 can scale the size of all dots. As a standard, the multiplier is 45 % and the exposition option "Area of Bubbles" is used. In the tab "Series Order" one can change the order between the dots. This calibration is relevant, if one dot overlaps another. The dot that is overlapped can be moved to a "higher level" by reallocating it backwards in the list of objects.[2]

Figure 13:
Check Box for the Activation of the Exposition of Revenue Vectors
(as Part of the Chart "Exposition by Broadcasters")
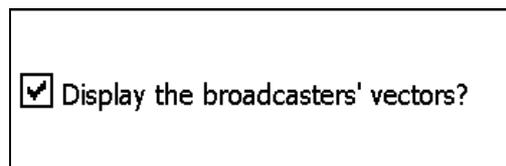
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[1] For more information on this topic see the corresponding Microsoft Excel 2003 Help Page at http://office.microsoft.com/en-us/excel/HP051991681033.aspx.

[2] For more information on this topic see the corresponding Microsoft Excel 2003 Help Page (section "Formatting Bubble Charts") at http://office.microsoft.com/en-us/excel/HA011170761033.aspx.

5. Illustrating the Method
with a Data Set from McKinsey 1999

For a better illustration of the algorithms described in Section 4 a data set pro-
vided by McKINSEY 1999 will be used as another example here.[1] The data set
is shown in Table 2.

Table 2:
Revenue Structures of Selected Public Service Broadcasters (in Mill. GBP)

Country	License Fee	Advert./ Spons.	Gov't Grants	Other Revenues	Sum
Japan (NHK)	3,471.00	0.00	0.00	0.00	3,471.00
Norway (NRK)	232.65	2.35	0.00	0.00	235.00
Sweden (SVT)	303.80	3.10	3.10	0.00	310.00
Australia (ABC)	299.88	0.00	0.00	6.12	306.00
United Kingdom (BBC)	1,921.57	0.00	0.00	59.43	1,981.00
Denmark (DR)	396.76	4.36	0.00	34.88	436.00
Germany (ARD)	3,120.92	342.54	0.00	342.54	3,806.00
Turkey (TRT)	60.18	5.10	21.42	15.30	102.00
Belgium (VRT)	174.79	49.94	0.00	2.27	227.00
Canada (CBC)	0.00	117.48	400.50	16.02	534.00
Germany (ZDF)	694.23	161.67	0.00	95.10	951.00
Belgium (RTBF)	87.84	24.40	0.00	9.76	122.00
Netherlands (NOS)	389.16	129.72	0.00	45.12	564.00
France (F3)	424.38	205.76	12.86	0.00	643.00
Czech Republic (CT)	48.80	19.20	0.00	12.00	80.00
Italy (RAI)	995.92	624.56	0.00	67.52	1,688.00
France (F2)	321.50	321.50	0.00	0.00	643.00
Portugal (RTP)	0.00	60.00	60.00	5.00	125.00
Poland (TVP)	91.52	105.82	0.00	88.66	286.00
Denmark (TV2)	109.00	313.92	0.00	13.08	436.00
Spain (RTVE)	0.00	298.88	116.75	51.37	467.00
South Africa (SABC)	44.28	191.88	0.00	9.84	246.00
New Zealand (TVNZ)	0.00	129.00	0.00	0.00	129.00
Germany (ARD+ZDF)	3,805.60	523.27	0.00	428.13	4,757.00
Belgium (VRT+RTBF)	261.75	73.29	0.00	10.47	349.00
France (F3+F2)	745.88	527.26	12.86	0.00	1,286.00

Source: KOPS 2007, p 56 (based on McKinsey 1999)

For more appropriate classification, the categories used in the McKINSEY study
have to be assigned temporarily to the three basic sectors and then have to be
reallocated. The revenues from advertising/sponsoring can be assigned com-

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[1] This section is based on KOPS 2007, pp. 54 – 59.

pletely to the pure market sector revenues (Column F in Figure 14); the Gov't grants can be assigned completely to the pure state sector revenues (Column D). A reallocation is only necessary for the revenues from the license fee – which can be assigned to the mixed voluntary sector revenues (Column C) –, and for "other" revenues – which can be assigned to the mixed market sector revenues (Column G).

Roughly estimated and not properly considering the exact legal, organizational and economic peculiarities of the different countries, we allocate half of the revenues from the license fee to the voluntary sector, the other half to the state sector: i.e. for all broadcasters we reallocate 50 % of the license fee to the state sector by inserting the correction factor 50 in Column H of Figure 14.

A reallocation is also necessary for the category "other revenues". Although this category is considerably high for some countries (e.g. for Turkey, the Czech Republic, Poland or Spain), in the McKINSEY classification it is treated as a heterogeneous marginal category, not allocated to the voluntary sector, the state sector or the market sector. Lacking more precise information, we allocate these revenues proportionally to the three sectors. Due to the initial assignment of "other revenues" to the mixed market sector we reallocate part of them to the state and voluntary sector by inserting 33.33 in Columns L and M of Figure 14 respectively.

Figure 14:
Worksheet "Data Input"

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Broadcaster's Revenues						Reallocation of Mixed Revenues of a Broadcaster in % (from / to)					
2	Broadcaster's Name	Pure Voluntary Sec.Rev.	Mixed Voluntary Sector Rev.	Pure State Sector Rev.	Mixed State Sector Rev.	Pure Market Sector Rev.	Mixed Market Sector Rev.	Voluntary/ State	Voluntary/ Market	State/ Voluntary	State/ Market	Market/ State	Market/ Voluntary
3	Japan (NHK)		3,471.00	0		0	0	50				33.33	33.33
4	Norway (NRK)		232.65	0		2.35	0	50				33.33	33.33
5	Sweden (SVT)		303.8	3.1		3.1	0	50				33.33	33.33
6	Australia (ABC)		299.88	0		0	6.12	50				33.33	33.33
7	United Kingdom (BBC)		1,921.57	0		0	59.43	50				33.33	33.33
8	Denmark (DR)		396.76	0		4.36	34.88	50				33.33	33.33
9	Germany (ARD)		3,120.92	0		342.54	342.54	50				33.33	33.33
10	Turkey (TRT)		60.18	21.42		5.1	15.3	50				33.33	33.33
11	Belgium (VRT)		174.79	0		49.94	2.27	50				33.33	33.33
12	Canada (CBC)		0	400.5		117.48	16.02	50				33.33	33.33
13	Germany (ZDF)		694.23	0		161.67	95.1	50				33.33	33.33
14	Belgium (RTBF)		87.84	0		24.4	9.76	50				33.33	33.33
15	Netherlands (NOS)		389.16	0		129.72	45.12	50				33.33	33.33
16	France (F3)		424.38	12.86		205.76	0	50				33.33	33.33
17	Czech Republic (CT)		48.8	0		19.2	12	50				33.33	33.33
18	Italy (RAI)		995.92	0		624.56	67.52	50				33.33	33.33
19	France (F2)		321.5	0		321.5	0	50				33.33	33.33
20	Portugal (RTP)		0	60		60	5	50				33.33	33.33
21	Poland (TVP)		91.52	0		105.82	88.66	50				33.33	33.33
22	Denmark (TV2)		109	0		313.92	13.08	50				33.33	33.33
23	Spain (RTVE)		0	116.75		298.88	51.37	50				33.33	33.33
24	South Africa (SABC)		44.28	0		191.88	9.84	50				33.33	33.33
25	New Zealand (TVNZ)		0	0		129	0	50				33.33	33.33
26	Germany (ARD+ZDF)		3,805.60	0		523.27	428.13	50				33.33	33.33
27	Belgium (VRT+RTBF)		261.75	0		73.29	10.47	50				33.33	33.33
28	France (F3+F2)		745.88	12.86		527.26	0	50				33.33	33.33

Figure 15:
The Table "Exposition by Broadcasters"
(as Part of the Worksheet "Data Output")

|	A	B-C	D	E	F-G	H	I	J-K	L	M	N	O
2	Broadcaster's Name	…	Corrected Voluntary Sector Revenues	Vectors	…	Corrected State Sector Revenues	Vectors	…	Corrected Market Sector Rev.	Vectors	Total Rev. of Each Broadcaster	Vectors of the Total Rev. of Each Broadcaster
3	Japan (NHK)	…	1,735.5	50.0%	…	1,735.5	50.0%	…	0	0.0%	3,471.0	100.0%
4	Norway (NRK)	…	116.3	49.5%	…	116.3	49.5%	…	2.3	1.0%	235.0	100.0%
5	Sweden (SVT)	…	151.9	49.0%	…	155.0	50.0%	…	3.1	1.0%	310.0	100.0%
6	Australia (ABC)	…	152.0	49.7%	…	152	49.7%	…	2.0	0.7%	306.0	100.0%
7	United Kingdom (BBC)	…	980.6	49.5%	…	980.6	49.5%	…	19.8	1.0%	1981.0	100.0%
8	Denmark (DR)	…	210.0	48.2%	…	210.0	48.2%	…	16.0	3.7%	436.0	100.0%
9	Germany (ARD)	…	1,674.6	44.0%	…	1,674.6	44.0%	…	456.7	12.0%	3,806.0	100.0%
10	Turkey (TRT)	…	35.2	34.5%	…	56.6	55.5%	…	10.2	10.0%	102.0	100.0%
11	Belgium (VRT)	…	88.2	38.8%	…	88.1	38.8%	…	50.7	22.3%	227.0	100.0%
12	Canada (CBC)	…	5.4	1.0%	…	405.8	76.0%	…	122.8	23.0%	534.0	100.0%
13	Germany (ZDF)	…	378.8	39.8%	…	378.8	39.8%	…	193.4	20.3%	951.0	100.0%
14	Belgium (RTBF)	…	47.2	38.7%	…	47.2	38.7%	…	27.7	22.7%	122.0	100.0%
15	Netherlands (NOS)	…	209.6	37.2%	…	209.6	37.2%	…	144.8	25.7%	564.0	100.0%
16	France (F3)	…	212.2	33.0%	…	225.1	35.0%	…	205.8	32.0%	643.0	100.0%
17	Czech Republic (CT)	…	28.4	35.5%	…	28.4	35.5%	…	23.2	29.0%	80.0	100.0%
18	Italy (RAI)	…	520.5	30.8%	…	520.5	30.8%	…	647.1	38.3%	1,688.0	100.0%
19	France (F2)	…	160.8	25.0%	…	160.8	25.0%	…	321.5	50.0%	643.0	100.0%
20	Portugal (RTP)	…	1.7	1.3%	…	61.7	49.3%	…	61.7	49.3%	125.0	100.0%
21	Poland (TVP)	…	75.3	26.3%	…	75.3	26.3%	…	135.4	47.3%	286.0	100.0%
22	Denmark (TV2)	…	58.9	13.5%	…	58.9	13.5%	…	318.3	73.0%	436.0	100.0%
23	Spain (RTVE)	…	17.1	3.7%	…	133.9	28.7%	…	316.0	67.7%	467.0	100.0%
24	South Africa (SABC)	…	25.4	10.3%	…	25.4	10.3%		195.2	79.3%	246.0	100.0%
25	New Zealand (TVNZ)	…	0	0.0%	…	0	0.0%	…	129.0	100.0%	129.0	100.0%
26	Germany (ARD+ZDF)	…	2,045.5	43.0%	…	2,045.5	43.0%	…	666.0	14,0%	4,757.0	100.0%
27	Belgium (VRT+RTBF)	…	134.4	38.9%	…	134.4	38.9%	…	76.8	22,2%	345.5	100.0%
28	France (F3+F2)	…	372.94	29.0%	…	385.8	30.0%	…	527.3	41,0%	1,286.0	100.0%
29-202	…	…	…	…	…	…	…	…	…	…	…	
203	Total		8,477.4	38.1%	…	9,104.9	40.9%	…	4,672.6	21,0%	22,254,94	100.0%

The results of these reallocations are listed in Figure 15. In the case of Turkey for instance, where total revenues amount to 102 M GBP (Cell N10), the "other revenues" are 15.3 M GBP (see Table 2), and we have allocated 5.1 M GBP to each of the three sectors. The total revenues allocated to the voluntary sector then amount to 35.2 M GBP (Cell D10), the total revenues for the state sector sum up to 56.6 M GBP (cell H10), and the total revenues allocated to the commercial sector amount to 10.2 M GBP (Cell L10).

In Columns E, I and M of Figure 15 the relative portions of the revenues from the voluntary sector, the state sector and the market sector are listed. These figures thus correspond with the revenue vector, introduced in Section 3.1. and they can be used to locate the national broadcasting systems graphically in the triangle model.

Figure 16 shows this graphical representation. By the different sizes of the dots it becomes obvious, first of all, that the broadcasters' budgets vary extensively. The dots are biggest for the German ARD (with a budget of 3.806 M GBP), the Japanese NHK (with a budget of 3.471 M GBP) and the British Broadcasting Cooperation, BBC (with a budget of 1981 M GBP); they are smallest for the Turkish TRT (102 M GBP) and the Czech CT (80 M GBP). One should recall, however, that in Figure 16 the sizes of the dots are determined by the broadcasters' absolute budgets. If one would use the per capita figures instead, i.e. the budgets that are available for each viewer/listener or for each household, the deviations between the broadcasters would be much smaller, and the ranking would also be different.

Figure 16:
International Comparison of Public Service Broadcasters' Revenue Structures
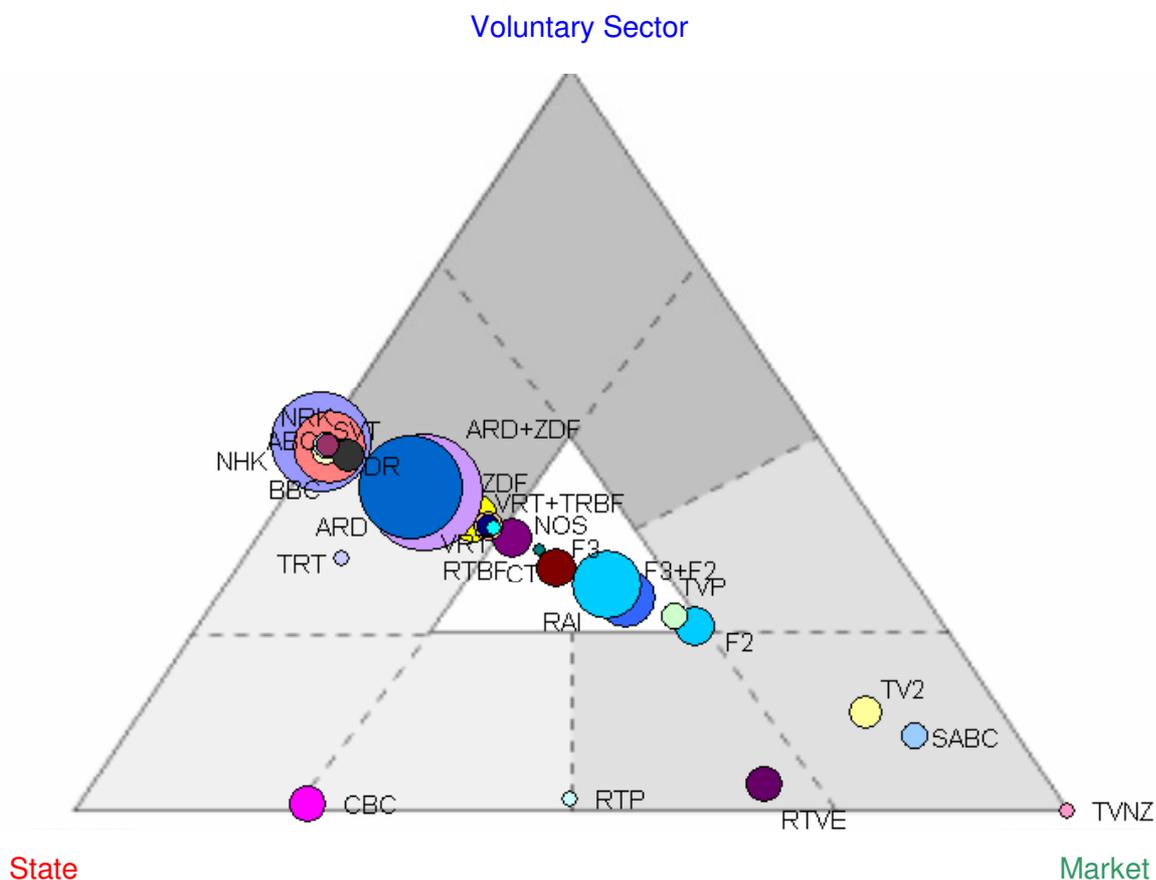
Source: Own representation on the basis of figures from McKINSEY 1999

As the license fee in our classification is a mixture of state revenues and third sector revenues, the countries that were placed on the right borderline of the triangle before the reallocation are now placed on the bisector (i.e. on the line that starts with Japan and ends with New Zealand). Among others, the German public service broadcasters ARD and ZDF are also placed on this line (or more exactly: somewhat above this line), which confirms the results we presented in

Section 4.3., especially in Figures 10 and 12 for the German broadcasting system.[1] Turkey now is located below this line, moving further to the governmental edge, as it is funded from (governmentally steered) license fees by 59 % (or 60.18 M GBP), and from direct governmental grants by 21 % (or 21.42 M GBP) and only from 5 % by commercial revenues (or 5.10 M GBP).

On the other hand, Canada, Portugal and Spain have moved upwards a little, away from the governmental pole, as governments there are hindered in varying the broadcasting grants discretionarily, both by written law and by the specific political culture.

Figure 16 also shows that many of the broadcasters are located inside the inner triangle. According to the classification we introduced in Section 3.2. these broadcasters are "e*qually mixed broadcasters".* The revenue vector of France 3 with 33 %, 35 %, 32 % in particular corresponds almost perfectly with such an equally balanced budget: Consequently F3 is located almost in the centre of the triangle. Since the market revenues are of considerable importance for these broadcasters, it is questionable if they should indeed be called public service broadcasters.

A second cluster of broadcasters can indisputably be labeled as public service broadcasters. This cluster is located in the left middle part of the triangle, or – with reference to Figure 4 (p. 23) – in Section E (state influenced voluntary broadcasters) and Section F (NGO influenced state broadcasters). Since we have allocated the revenues from the license fee for all countries as a lump sum only (50 % for the state sector, 50 % for the voluntary sector), all broadcasters of this cluster are located on the border between Section E and Section F (with the exception of the Turkish TRT, that is located nearer the state pole because of the state grants it receives). A more detailed allocation that took the legal and institutional peculiarities of the countries into account would lead to a more precise location, with some broadcasters clearly located in Section E (state influenced voluntary broadcasters), and others clearly located in Section F (NGO influenced state broadcasters).

The distance from the left edge of the triangle is different for this cluster of broadcasters. Some are located on the rim of the triangle (like the Japanese NHK, the Norwegian NRK, the Swedish SVT and the British BBC, which receive (almost) no market revenues); others are located nearer to the centre of the triangle, as they receive higher portions of their revenues from the market (like the German ARD and ZDF or the Belgian VRT and RTBF).

The graphical representation also reveals that some of the broadcasters considered as "public service broadcasters" by McKINSEY, in fact cannot be classi-

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[1] In Figure 16 the average vector of the German public service broadcasters is located nearer the state pole than in Figure 12, where we allocated the license fee revenues between the state and the third sector by the (more appropriate) relation of 33% to 67% (instead of the relation 50% to 50% which was used for Figure 16).

fied as public service broadcasters. Firstly, this is true for all broadcasters that are mainly funded by market revenues, like the Polish TVP (47.3 % market revenues), the French F2 (50 %), the Spanish RTVE (67.7 %), the Danish TV2 (73 %), the South African Broadcasting Corporation SABC (79.3 %), and New Zealand's TVNZ (100 %). Secondly, there are some broadcasters, for which the revenue structures suggest a high degree of state influence, like the Portuguese PTP and the Canadian CBC. For them a classification as public service broadcasters is at least questionable. On the other hand, we have emphasized in former sections that state revenues do not necessarily mean state control, if there are explicit rules about the amount of the grants, and watchdogs that prevent the state from violating these rules, state grants may be comparable to revenues from a license fee.[1] Under these assumptions the Canadian CBC, and maybe also the Portuguese RTP, would be funded like public service broadcasters. In Figure 4 (p. 23) they would be located in Section F (CBC) or in Section D (RTP).

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[1] In the more detailed description of the German broadcasting system (KOPS 2007, Section 3.5.) we had argued that in the instance of the state grants that go to the Deutsche Welle, for instance, the state influence is not much higher than for the revenues from the license fee. Therefore 45 % of these grants were allocated to the voluntary sector, and 55 % were allocated to the state sector (for the German license fee we had assumed that 55 % ought to be allocated to the voluntary sector, and 45 % to the state sector).

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