Television software studies: an extension to production studies theory

Estudos de software televisuais: uma extensão dos estudos de produção

CARLOS EDUARDO MARQUIONI[a]

Universidade Tuiuti do Paraná, Graduate Program in Communication and Languages. Curitiba – PR, Brazil

ABSTRACT

This study briefly presents the potential need for developing an extension to Production Studies theory (titled here as Television Software Studies). Such extension encompasses processes related to management, integration and sync regarding development of software that should be executed by TV producers during TV shows production, so that, posteriorly, broadcasters can supply companion apps to sync ads between screens. We pointed that although such alternative complexifies TV production, it can also minimize the risk of audience's distraction during multiple screen experience materialization, promoting a reduction in TV shows sponsorship.

Keywords: Software engineering process, project and people management, multiple screens, TV production practices, apps

RESUMO

Este artigo brevemente apresenta a necessidade potencial de desenvolver uma extensão para os estudos de produção (intitulada aqui como *estudos de software televisuais*). Tal extensão engloba processos relacionados à gestão, integração e sincronização de desenvolvimento de software, que seriam executados por produtores de TV durante a produção dos programas televisivos para posterior fornecimento de *companion apps* pelas emissoras para sincronização de anúncios publicitários entre telas. É argumentado que, apesar de a alternativa complexificar a produção de TV, ela pode também minimizar o risco de que a distração da audiência durante suas materializações de experiências de múltiplas telas promova uma redução no patrocínio dos programas de TV.

Palavras-chave: Processo de engenharia de software, gerenciamento de projetos e pessoas, múltiplas telas, práticas de produção de TV, *apps*

[a] Professor of the Graduate Program in Communication and Languages at Universidade Tuiuti do Paraná. Orcid: https://orcid.org/0000-0002-6201-6070. E-mail: cemarquioni@uol.com.br

INTRODUCTION

IN THIS STUDY we argued that an ongoing cultural reconfiguration related to the ways viewers watch TV potentially motivates broadcasters execution of software development activities during TV production. Indeed, watching TV is no more limited to looking at a TV set, and eventually involves using various technological and mobile devices, sometimes manipulating two (or more) gadgets concomitantly while watching. Curiously, in some cases, watching TV occurs without the presence of a TV set, since TV started with digitalization being watched also on gadgets like smartphones, tablets, notebooks etc. This reconfiguration related to the platforms of distribution impacts the existence of what is considered here as the televisual experience[1] that would result from two main aspects – the planned "flow" (Williams, 2005, pp. 89-90) and the *live* characteristic of television (Marquioni, 2016).

A second assumption considered in this study is that the main three social actors that operate in televisual ecosystem (audience, advertisers and broadcasters) affect each other mutually (Gray & Lotz, 2012, p. 22): thus, changes regarding one of them potentially affect at least another one. Our study considers that changings in the ways of watching TV with the usage of multiple gadgets (by audience) tend to impact the ways both of TV production (by broadcasters) and of sponsoring TV shows (by advertisers). And that mutual impact leads to the mentioned assertion of broadcasters' need to perform software development activities during TV production. Indeed, although the obvious relation in the redefinition regarding the ways of watching is associated with the usage by viewers of technological gadgets while watching TV, as Raymond Williams (2005) pointed in the early 1970s, television should be analyzed simultaneously as a technology *and* a cultural form: in this study, we considered that the reconfiguration in the ways of watching should be analyzed as a cultural one (associated with a technological update).

Such cultural reconfiguration results from a previous *audience preparation* regarding the usage of multiple gadgets over the years – due both to technological devices supply (as can be noticed with the remote control, for example) and to calls to action of TV channels (like voting in reality shows decisions). These examples are considered as constituting not only a kind of motivation for the cultural reconfiguration here addressed, but also as part of an *in process* update in the ways of watching by viewers. In 2017, when a previous version of this study was presented[2], such *in process* update in the ways of watching TV was referenced by this author as second screen. We claimed here that, additionally to the aforementioned cultural and technological perspectives, the usage of multiple gadgets can be analyzed also as an update in experience: indeed, James

[1] Since the terms *experience* and *televisual experience* appear along this study, a brief explanation regarding their meaning as considered here is necessary. To such explanation, it is firstly necessary to notice that culture is understood in the study as "common meanings" (Williams, 1989, p. 8), shared, that are redefined by social actors *in the duration of time*. Starting from this general definition of culture, *experience* can be settled as a theoretical notion that enables analyzing the communicational materialities beyond their technological support. The notion refers to *cultural patterns* which allow the recognition of "certain general 'laws' or 'trends', by which social and cultural development as a whole can be better understood" (Williams, 2001, p. 58). Thus, *experience* is an element that contributes to the generation of meaning and enables understanding communicational materialities both culturally and in processual terms (making it possible to individuals to identify the stages/ steps that could be executed while he/she is using such communicational materialities – thus, while he/she is materializing an *experience* related to the use of a gadget). Since culture is "made by living, made and remade" (Williams, 1989, p. 8), former materialization of experiences contributes to understanding possibilities of redefining them (as well as how to materialize the redefined experiences), establishing what can be designated as a cultural preparation that encompasses even the process used to manipulate/use the gadgets. When related to gadgets used to watch TV, there is *televisual experience* materialization – regardless of the hardware (the

Blake (2017) also states that the second screen "is best understood not as an object or a media device, but as an *experience*" (p. 1). Or, as addressed herein, the concomitant usage of multiple gadgets while watching TV constitutes a cultural reconfiguration in the former *televisual experience* that could be noticed in various platforms of TV content distribution worldwide. Finally, it must be noticed that the author of this study uses the term *multiple screens* (instead of second screen) to reference the experience related to the usage of multiple gadgets while viewers watch TV, independently of the technological platform used to watch[3].

In this complex context (encompassing technical and cultural changes, as well as reconfigurations in experience), the mentioned relations between social actors and the impact of multiple screen usage go beyond the audience's home limits, motivating also potential adaptations in broadcasters' production processes, as well as in the TV shows sponsorship : worldwide, the reconfigured ways of watching TV has been pointed as responsible for potentially promoting a "distraction" (Blake, 2017, p. 7)[4] that can reduce TV production sponsorship, since audiences "are using mobiles to engage with social media or search the web during ad breaks in TV programmes and that is reducing the impact of TV adverts" (Blake, 2017, p. 149). But before advancing, it also must be mentioned (regarding distraction) that

> when analyzed over the years, it can be noticed that the concomitant gadgets usage did not start with multiple screen usage: there were many previous actions that prepared the audience culturally to such usage . . ., so that the distraction seems even associated with a cultural preparation. (Marquioni, 2018b, p. 46)

Or, to use a key term to this study: the distraction seems associated with the redefinition of the *televisual experience*. Although in the past the audience executed other actions while watching TV that promoted distraction "(like flipping through a magazine, doing household chores etc.) –, with the multiple screens experience, the occurrence of a *special distraction* format started (in the sense that [such distraction] is, more than possible, expected: [it is] *aprioristic*)" (Marquioni, 2018b, pp. 50-51). Thus, "distraction became, over the years, a part of televisual experience" (Marquioni, 2018b, p. 54) while such experience was being redefined.

Despite the value of real-time feedback for producers through multiple screen usage, in this study we pointed that an integrated and synchronized development of software (apps) with TV production can constitute an alternative to sync of ads between screens (Carneiro, 2012), minimizing the effects of such

television set or a technological device) used to watch the aired content – that, culturally, has been redefined over the years by viewers. However, as argued in the next paragraphs, some adaptations in the ways viewers started materializing their *televisual experience* have worried TVs sponsors.

[2] That presentation occurred in a section of the *Media Production Analysis Working Group* during the annual conference of the International Association for Media and Communication Research (IAMCR) that took place in Cartagena de Indias (Colombia).

[3] The option in using *multiple screen experience* can be explained not only by the finding of authors mentioning the usage of "third and fourth screens" (Alvarez-Monzoncillo, 2011, p. 44), but also due to the contributions presented by a senior Spanish researcher during the debate on the previously mentioned presentation of an earlier version of this study in IAMCR world congress. In that occasion, the researcher mentioned that she felt uncomfortable with the reference to only two screens (the first and the second ones) to materialize the experience, since when she watched TV, she *used* various screens (typically more than two concomitantly): she mentioned that she could use, indeed, a complex combination encompassing screens of her smartphone, tablet, smartwatch, notebook – additionally to her TV set screen.

[4] The distraction issue was addressed also by Proulx and Shepatin (2012, p. 106), Tussey (2014, p. 207), Wolff (2015, p. 74) and Marquioni (2018b).

"distraction" (since it started to be expected). In order to develop such apps while producing TV shows, the mentioned integration and sync should be done. Thus, the appointments presented in this study intend to be useful mainly concerning empirical TV production – particularly considering the Brazilian terrestrial commercial TV (referenced also as open TV, free TV, linear TV or broadcasted TV). We presented here the need for defining a TV production discipline to (i) conceptually systematize the concomitant execution of both software and TV production processes, and (ii) guide the execution of some of the related *praxis* activities. This discipline is provisionally titled as *Television Software Studies,* and it also considers the need for adopting a management process to orchestrate the integration and sync of the complex processes during that concomitant execution – as addressed in the next three sections of this study.

Finally, it is worth noting that in this study an overview of the idea regarding *Television Software Studies* is presented, since some topics related to such idea have been addressed by the author in another studies available in Communication journals that are referenced to along this study (when an item related to such studies is mentioned, an indication of the correlated article is presented to facilitate the access to that content in case of interest).

CULTURAL RECONFIGURATIONS IN THE WAYS OF WATCHING TV: AN OVERVIEW

The complexities addressed in this article warrant a brief summary before proceeding: as previously mentioned, reconfigurations in the ways of watching TV are expected when television is considered simultaneously a technology *and* a cultural form (Williams, 2005, pp. 75-76): being a cultural form presupposes meaning adaptations (reconfigurations) *in the* (previously mentioned) *duration of time*. This study addresses meaning redefinitions as being *in process* (on the move), particularly due to the use of technological devices by audience. An example of such meaning reconfiguration is that of the multiple screens – which are addressed here as constituting an *experience*. Thus, the expression *multiple screen experience* is adopted to refer to the cultural redefinition that can be observed in televisual experience, related to the use of one (or multiple) gadget(s) connected to the Internet while watching TV. The expression covers both (i) social TV and (ii) multiple screen itself: (i) social TV is used to refer to the "metamorphosis of television" (Colletti & Materia, 2012, p. 12) noticed when the usage of the gadget connected to the Internet covers the posting of comments (by the audience) in digital social networks (like Facebook or Twitter), related to the TV show they watch on TV. The term (ii) multiple screens (or the

previous *second screen*) has been used to refer to the search by the audience for additional content on the Internet related to that one aired on TV. Associated with the multiple screen experience it has been pointed the occurrence of the mentioned distraction related to the attention sharing that occurs when viewers manipulate different gadgets while watching TV (or even when audience watches TV on a device that enables multiple functions, like a tablet or a smartphone); that distraction has been treated as constituting a critical aspect (and a potential risk) to commercial terrestrial television sponsorship.

To understand the mentioned relation between distraction and sponsorship reduction, it is necessary to consider the risk of advertisers' ads not being seen (or that these ads are seen with less attention than the sponsors would wish) due to the attention sharing associated with the usage of multiple gadgets while watching TV: The "resulting head movement [up and down between devices] has already been nicknamed 'meerkating'. Even where multiscreen engagement is linked to the television itself, it can still be a significant distraction" (Blake, 2017, p. 3).

An alternative that seems reasonable to minimization of that risk of distraction regarding ads is to synchronize the advertisement pieces between the multiple devices used. With that, regardless of the gadget the viewer looks at, the probability that he/she sees (have some contact with) the ads is increased. However, to promote that sync it is necessary to adopt additional software development processes during the production of the TV show, increasing the complexity of TV typical production process (despite some activities related to computing have already been added to TV production process due both to the digitalization of contents and to the availability of broadcasters' contents on a variety of technological platforms – *TV Everywhere apps*, for example). But additionally to this already ongoing integration, it should be noticed that independently of the multiple screen experience perspective, TV researcher Vicki Mayer stated (2009) that alienation could be observed globally in the televisual production context. According to Marx's writings, alienation is noticed when the product of a worker

> exists *outside him* [the worker that created it], independently, as something alien to him, and that it becomes a power on its own confronting him. It means that the life which he has conferred on the object confronts him as something hostile and alien. (Marx, 2010, p. 29)

The existence of alienation in the case of TV production constitutes lack of knowledge in the executed processes to such production; also, that lack of knowledge becomes potentially more critical with the execution of additional

processes related to software development during TV shows production. Additionally, alienation tends to make it more difficult the identification of the activities in TV production to which additional software development processes should be integrated and sync. Thus, the extra activities to be executed tend to make the process more unknown, potentially increasing the televisual production alienation[5].

In order to equate the complex scenario, the author of this study has been researching (since early 2016) alternatives to systematizing the integration and synchronization of two life cycles[6] (TV production and software development) using an interdisciplinary framework encompassing Production Studies, Software Engineering and Project Management. Such framework points the need for TV production studies to encompass both software development and management aspects to systematize the ads sync between devices – contributing to equating the *ongoing* cultural reconfiguration in viewers' televisual experience with the execution of software development activities during TV production.

It seems reasonable to infer that the conceptual discipline to address the impacts on TV production related to the cultural reconfiguration is Production Studies. Indeed, the framework being developed is an alternative that contributes to systematization of the execution (of Production Studies in an integrated and sync way with the other theoretical perspectives mentioned); the suggested discipline is provisionally titled as *Television Software Studies*. The option to adopt this provisory title is related to the fact that software studies focus on the study of the social and cultural effects of software systems (in the case of this study, such effects are related to both social and cultural aspects of television – beyond technology itself). It is also necessary to state that the managerial aspect addressed in this study is justified with the need for (i) an orchestration during the execution of two complex project life cycles (TV production and software development), and (ii) adopting processes that constitute alternatives to potential minimization of the alienation due to the usage of a well-known and controlled process.

A kind of *expansion* in Production Studies motivated by the suggested *Television Software Studies* seems possible also because Production Studies are interdisciplinary in their essence, seeing "production activities as cultural texts" (Mayer, Banks, & Caldwell, 2009, p. 5). It seems reasonable to infer that if meanings related to TV are subjected to changes (culturally), TV Production Studies could be reconfigured as well. And with the usage of managerial processes, the changes tend potentially to increase in a known/controlled way.

Due to the complexity and theoretical extension of the perspective, only an outline of the processes that would constitute the *Television Software Studies* is

[5] Here it must be pointed out that an alternative that has been offered over the years to minimization of effects of the division of labour (and the resulting alienation) is the usage of steep hierarchies: "a complex set of operating procedures to determine reporting channels, authority levels, departmental charters, job definitions, and operating policies" (Savage, 1996, pp. 150-151). Acting in an integrated way with such hierarchies, in this study we argued that once the knowledge of processes is shared among the professionals that participate of TV production (what can be achieved with the mapping, formalization and disclosure of both processes regarding TV production and software development – as suggested in this study and in the other ones referred to here related to the ongoing research), it seems reasonable to suppose that an increase in the understanding of the executed activities (what potentially minimizes alienation) would occur. Thus, as a complementary benefit, it is possible to infer that the definition addressed in this study can contribute to minimizing the effects of alienation since, with the mapping of their activities, TV production staff can make (or recover) "contact with the overall process" (Savage, 1996, p. 165).

[6] A project life cycle is the series of phases that a project passes through from its start to its closure" (PMI, 2013, p. 38).

addressed in this study: particularly the project integration management processes considered as key factors to enable the orchestration of the two project life cycles affected. More precisely, one of the Project Management Knowledge Areas (KA) defined in the *PMBOK guide* (Project Management Institute [PMI], 2013) is presented as a potential orchestrator of the activities of the mentioned life cycles. This KA is entitled Project Integration Management (PMI, 2013, pp. 63-104), and constitutes the reference to the management theme addressed in this study.

> [The Project Integration Management] includes characteristics of unification, consolidation, communication and integrative actions that are crucial to controlled project execution through completion, successfully managing stakeholders expectations, and meeting requirements . . . [;] includes making choices about resource allocation, making trade-offs among competing objectives and alternatives, and managing the interdependencies. (PMI, 2013, p. 63)

Finally, it is necessary to point that although in this study the case of the multiple screen experience is presented as observed in Brazilian commercial terrestrial televisual ecosystem, such experience has been materialized in most countries that have a technologized TV audience. The option to address here the Brazilian case is justified because the author of this study has conducted analyses regarding Brazilian commercial broadcasting TV since the development of his doctoral thesis. Additionally, the selection of multiple screen experience as observed in Brazilian commercial terrestrial television is justified because Brazil is a country where "linear" (Douglas, 2015, p. 100) TV – or "planned flow" (Williams, 2005, pp. 86-87) – reaches significant audiences and maintains cultural relevance. Also, Brazilian commercial TV depends on the *audience selling* business model[7]: but, the analysis and reflections presented here seem potentially applicable to TV production practices when there is need to develop software related to TV production (as, for example, in the case of development of software for *TV Everywhere apps*). To understand why one considers the possibility of expanding the content presented in this study regarding the scenario of multiple screen experience to other contexts, it can be noticed that while the expression *multiple screen* refers to the hardware where the viewers look at (during the materialization of the experience), the *experience* itself is established due to the software that runs on the multiple screen hardware (due to the software interface that enables social TV, or enables searching for additional content related to that one aired on TV). In other words: in scenarios where

[7] However, it is worth mentioning that senior executives of Hulu, Sony Crackle and Netflix have mentioned in interviews that characteristics of the terrestrial TV business model (mainly those related to *audience selling*) are migrating to other distribution platforms (Marquioni, 2019a).

the development of software related to the TV show is required, the content presented in this study is potentially applicable.

A BRIEF PRESENTATION OF THE BRAZILIAN TERRESTRIAL TELEVISUAL CONTEXT

Once that in this study the main empirical contextualization regards the Brazilian commercial TV scenario, the relevance of *audience selling* business model needs to be presented. Here, the case of Globo Network[8] will be considered. This broadcaster is the audience leader in Brazilian commercial terrestrial television; also, it is the world's third largest commercial TV network, and produces close to 90% of its aired content (basically sponsored by selling audience to advertisers). Thus, reductions in sponsorship tend to affect most of televisual production of that TV channel.

The audience reached by Globo Network enables to point that even knowing that in some countries the televisual broadcast system is in decline, it seems premature to say that in Brazil "the time when a nation felt unified because everyone was watching the same program at the same time is over (except for major events like sports, significant news, and very few shows)" (Douglas, 2015, p. 19): despite the emergence of a "new version of community where people connect across the globe by nothing more than shared tastes and interests" (Douglas, 2015, p. 19), the content aired in Brazilian commercial terrestrial televisual schedule remains contributing to the constitution of the *Brazilian community*[9].

Even during Brazilian economic crisis, Globo started to offer its *over-the-top* (OTT) TV services: its *TV Everywhere app* (entitled Globo Play) was launched in early 2016. Globo's option to offer its whole content to be accessed using mobile devices (even being a broadcast TV network) can be understood when noticed that for more than one decade (during the period of economic development), Brazilian people bought mobile devices and developed the cultural habit of using such gadgets to execute everyday activities – including watching Brazilian digital TV, that has its signal received by some smartphones devices – that had their sales increased ("Vendas de smartphones", 2013) –, characterizing what can be pointed as one of the inceptions of the emergence of a Brazilian *technologized* TV audience. Additionally, data supplied by Brazilian government related to the year 2013 (released in 2015) presented in the National Household Sample Survey (Pesquisa Nacional por Amostra de Domicílios – PNAD) identified "for the very first time . . . the homemade access to the Internet using . . .

[8] In other studies, the author of this article presented that (i) Globo Network used in a quite limited way the companion app screen for ads presentation (Marquioni, 2017a), and that (ii) even in the case of using hotsites for ads presentation, Globo uses the technological apparatus apparently with restrictions (Marquioni, 2019a).

[9] Here the term *Brazilian community* refers to Benedict Anderson's "imagined community" (1991, p. 39), according to which communities would be established from shared "replicas" – in the case of this study, "replicas" that are shared on TV that contribute to the feeling of belonging (of being part of a nation) by the viewers.

mobile phones, tablets, television and other electronic devices" (Instituto Brasileiro de Geografia e Estatística [IBGE], 2015). That report indicated that more than 50% of Brazilian domiciles used (in 2013) cell phones and tablets for home access to the internet (IBGE, 2015). Indeed, the period when the acquisition of mobile devices increased coincides with the beginning of the multiple screen experience materialization in Brazil. Thus, to be adherent to the previously presented term, it is possible to infer the existence of an *in progress* cultural reconfiguration in the ways of watching TV that occurs by means of a cultural preparation, and which also leads to an experience redefinition.

To explain the assertion, while the audience started watching TV on their smartphone screens, viewers also began to interact using the mobile phone device while watching TV on the TV set, materializing their multiple screen experience.

Getting back to the case of Brazilian Globo Network, especially when considering that the "[t]elevision distribution is no longer constrained by a bottleneck of three networks or limited spectrum space, but flows through wires, airwaves, and over satellite links to televisions, computers, and even mobile phones" (Lotz, 2009, p. 33), it is reasonable to infer that a television network that is the audience leader in the country for decades would have interest (or trend) in being available on most technological platforms to keep its cultural influence (even considering the need for paying for the OTT service).

In the presented scenario of technologized TV audience, it can be pointed that in the case of broadcasters not supplying an alternative to both the public conversation and the search for additional content related to the aired one, viewers tend to materialize such actions *independently* of TV channels. Audience can use a search engine like Google (to access additional content), or a digital social network, like Facebook or Twitter, to post comments directly when materializing their social TV experience. As a practical result of that *independent* materialization of multiple screen experience by viewers it can be mentioned that ads visualization on the first screen (the TV screen – or the screen on which the televisual content is watched) is potentially compromised due to the previously mentioned "distraction" associated with the attention sharing promoted by the concomitant usage of multiple devices. And this distraction would tend to motivate a reduction of advertising investments in the audience selling business model, especially due to the reach of its ads (Williams, 2005, p. 66). An alternative to minimization of the risk of reducing advertising sponsorship is the synchronization of ads

between screens (Carneiro, 2012); with this sync, regardless of the screen which audience looks at, the ads tend to be seen[10].

An alternative that enables a *multiple screen experience* is the supply (by broadcasters) of a "companion app" (Blake, 2017, p. 33). But if there is an app supplied by broadcasters, it is necessary to develop it. In this study we considered that the development of the app should happen preferably during the production of the TV program – and it should not start at "a later stage" (Blake, 2017, p. 53). Also, the *app maintenance* should occur all over the season while the TV show is on air (Blake, 2017). It is necessary to observe that the *app maintenance* encompasses not only the realization of technical adjustments and improvements in the software but also the periodical insertion of relevant additional contents in relation to that aired on TV[11].

With this scenario, all the phases of TV production are potentially impacted since both app development and maintenance presuppose using a software process and a software project life cycle. In the case of TV broadcasters, the software development life cycle needs to be integrated and synchronized with the TV production life cycle (also considering the management process). The next section of this study presents key elements of that integration and sync, focusing mainly on the managerial perspective – in this sense, the following content complements the perspectives addressed in previous studies, where the *basis process* for TV production (Marquioni, 2017b) was addressed and notes regarding software development (Marquioni, 2019b) were presented.

TV PRODUCTION AND SOFTWARE DEVELOPMENT LIFE CYCLES INTEGRATION AND SYNC: AN OVERVIEW STARTING FROM A MANAGERIAL PERSPECTIVE

In order to start the presentation of the project management processes, it is necessary to reinforce that different productive process must be considered to enable the integration and sync between TV production and software development lifecycles. And in this scenario, management activities constitute a particularly critical factor: definition of management processes is both an alternative to potential minimization of the risk of increasing the previously mentioned televisual production alienation that can be globally observed and an alternative that reduces it with the mapping, formalization and disclosure of the processes for TV production and for software development. Regarding alienation, the TV production bibliography consulted presents various and significant differences between authors that establish an effective *mixture*

[10] It seems reasonable to infer that the presentation of ads on multiple screens tend to increase the chance of the advertising campaign to be seen; to such presentation materializes, during TV production process, *sale* of *screens* to the TV show sponsors could occur. Indeed, such sale is suggested in the phase "To execute marketing actions and promotions" (related to the *Administrative* activities category) on the *reference basis process developed* (Marquioni, 2017b). Regarding that sponsors' selling subject, another reference that can be accessed is the "Marketing phase" presented by Marcus Gillezeau and Evelyn Saunders (2013). According to the authors, during their proposed *Marketing phase* in TV process, one would identify "the needs of the campaign to promote iterations that might include an app, web series and online interactive elements".

[11] Preliminary reflections on that subject can be read in Marquioni (2018a).

encompassing technical, administrative and managerial activities. This *mixture* (that constitutes a documented example of the alienation in TV production process) seems to be motivated by the fact that the development of TV shows requires the execution of "hundreds of microprocesses from script-writing to distribution, [that] rely on thousands of collaborative efforts" (Mayer, 2009, p. 23). Also, the observed maintenance of that mixture allows inferring that the focus of attention of TV production community tends to be oriented to the production itself (but there is not necessarily an interest in a conceptual understanding of the processes executed for that production). However, if not managed appropriately, simply adding processual activities related to software development for TV production can make it even more difficult to integrate and synchronize the life cycles.

The processes of PMBOK Project Integration Management KA (PMI, 2013) are considered here as an alternative to the orchestration of the television production process in order to minimize difficulties related to the life cycles integration and synchronization. The term *integration* is especially relevant in the context of this study when considering that "it's humanly impossible for one person" (Mann, 2009, p. 100) the production of the whole TV show in the redefined media scenario. It is necessary to establish specific management activities for each part of the project (and for each life cycle). Thus, attesting the assertion that "the changed workplace environment and industrial circumstances associated with network television production in the age of the Internet have greatly altered the practices of authorship" (Mann, 2009, p. 99), it is necessary to consider adaptations in a broader scope, coupled also with the need for multiple managers to execute a concurrent management of various projects with convergent objectives that lead to the broadcast of TV show. Here we considered that the main management must be assumed by the TV show production (since the central objective is related to a TV show production), while another management had to be executed in relation to the app development and maintenance, observing the characteristics of each life cycle as well as the points of integration and synchronization between them.

Regarding the aforementioned integration and sync, it is necessary to mention that the (also previously referenced) *reference basis process* that was developed in the ongoing research considers the usage of *process tailoring*: thus, such "*basis process* can be understood as constituting a starting reference to define the process to be used in each case" (Marquioni, 2017b, p. 51) – that is, the *basis process* needs to be tailored to be adherent to the business scenario of the TV channel. To justify the relevance in defining a process that can be

tailored, one can point the complexities that potentially motivate adaptations to the mode of the process execution. As an example, it is possible to mention how the budget available to the TV show production affects the tailoring of the process used to produce that TV show. Such budget influences, for instance, the functional roles that will be assigned to a project, considering both the TV content staff and the software development one: "the quantity and skill of the professionals to be hired as well as their experience have a direct relation with the defined budget" (Marquioni, 2017b, p. 54). Also, the software legacy structure (related to the software and hardware infrastructure already available in each TV channel, since broadcasters potentially have an already available infrastructure of hardware and software devices) must be considered to define how the process will be *tailored* (Marquioni, 2019b), as well as the size of the TV channel needs to be observed (in order not to over-bureaucratize the TV show production)[12].

[12] Since processes execution is obviously associated with bureaucracy, it seems reasonable to consider that small TV channels should execute less extensive processes than larger ones – to understand the assertion, it can be mentioned that at least there is a trend of few human resources available to execute the defined processes.

Indeed, there are many aspects that should be observed regarding the definition of the process to be used: besides the cases mentioned in the previous paragraph, it is necessary to address the need for mitigating the risk of processes overlapping between the TV production and the software development. To conduct such mitigation, it is necessary the existence of a formalization encompassing the business areas processes – also justifying the development of the *reference basis process* for TV production (Marquioni, 2017b) –, as well as a reference process for software development related to the development of apps in TV context (Marquioni, 2019b). With the formalization of both processes, it is possible to define what would constitute an adequate process for each TV company (or which processes could be tailored to enable their execution in each case).

Focusing on managerial aspects (the central subject of this study), it must be addressed that a fundamental management activity that should be executed is related to identifying and evaluating possible procedural approximations (that characterize the mentioned points of integration and sync) between the TV production and the app development processes. Thus, the knowledge related to the process contributes to analyzing the feasibility of proceeding with the execution of both life cycles. Identification and evaluation are relevant mainly because the product of the project (in the case of this study, the result of the project executed to create the TV show) is directly influenced by "the process used to develop and maintain it" (Chrissis, Konrad, & Shrum, 2010, p. 5). In order to understand how the synchronization and integration could occur, some integration activities developed in the *in progress* research project are presented below.

Such activities are presented in the mentioned *basis process* – elaborated for televisual production – and are considered here as the reference to the life cycles integration and sync. In that sense, Table 1 shows a part of the managerial activities of that *basis process* (in this study, only the activities of the *basis process* related to the initial phases of TV production life cycle that are also associated with managerial aspects are presented).

Table 1
Managerial activities in the TV production life cycle initial phases of the basis process.

Activity category	TV production life cycle initial phases	
	Conception	Pre-production
Management	(a) To define required roles and responsibilities	(e) To define the detailed production schedule
	(b) To develop preliminary schedule	(f) To review the TV show proposal
	(c) To present the TV show proposal	(g) To review the budget
	(d) To present the budget	

Note. Adapted from Marquioni (2017b, p. 59).

To briefly explain the activities showed in Table 1, as well as presenting some basic reelations between these activities, it can be mentioned that the activity (a) *To define required roles and responsibilities* corresponds to that where there is the definition of the required functional roles to produce the TV show. The activity (b) *To develop preliminary schedule* encompasses the creation of an initial and basic schedule to identify the main project milestones. The activity (c) *To present the TV show proposal* encompasses a brief description of the TV show. In the activity (d) *To present the budget,* the total budget planned for the TV show production (including that related to the app development and maintenance) is indicated. With the execution of these initial activities, it is possible (e) *To define the detailed production schedule*, indicating not only the milestones, but also effective tracking and oversighting dates to activities integration. Additional activities (f) *To review the TV show proposal,* and (g) *To review the budget* should be conducted in order to update specifications and values, also trying to fulfill both the requirements of the TV show, and the requirements related to software development. This contributes to enabling managerial negotiations for alignment of stakeholders' interests.

Although the activities showed in Table 1 were listed without considering software development activities (even the attributed names were obtained in technical bibliography of TV production), a bibliographic review of Software Engineering theory makes it possible to identify various potential points of integration with the *basis process* of TV production. In this study such points are presented ahead only in relation to the previously mentioned activities of the *Conception* phase, particularly starting from "the four Ps [of the software development process]: [i] people, [ii] product, [iii] process, and [iv] project" (Pressman & Maxim, 2015, p. 685).

Regarding (i) people, the Software Engineering bibliography informs need to define the staff members according to five constituencies (Pressman & Maxim, 2015, p. 687): *senior manager*, *project (technical) manager*, *practitioners*, *customers* and *end users*. This definition refers directly to the activity showed in Table 1 (a) *To define required roles and responsibilities*. It is possible to consider the senior manager (the executive producer of the TV show) as the responsible for managing the whole TV show. Additionally, the existence of two technical managers (that would report to one senior manager) can contribute to the orchestration of technical activities. One of these technical managers would be responsible for managing the TV show project, and the other would be the responsible for the app development project (the latter should be, preferably, a software professional with managerial skills). The TV show production team and the software technicians would be the practitioners, and the customer would be the key viewers nominated by the broadcaster to enable requirements elicitation (the key viewers are responsible for the definition of the software product features; they could be selected, from instance, starting from a viewer database, and could be interviewed to inform general requirements they would like to use in an app supplied by the TV channel). Finally, audience constitutes the end users.

In other words, considering the activity (a) *To define required roles and responsibilities*, once the software activities are performed according to a software life cycle that would be conducted integrated and synchronized with the TV production life cycle, it is important to identify the software technical team while defining the TV show project team. Indeed, not only the software project manager, but also the software technical staff and the key user for the definition and validation of the app requirements[13] should be named at this moment. It constitutes a hierarchical management structure (that seems necessary in order to minimize potential difficulties in integration and synchronization of life cycles, also minimizing the mentioned risk of increasing TV production process alienation)[14]. The approach is totally adherent with the presented definition of

[13] That validation is related to executing the Tests discipline/phase before launching the app.

[14] The hierarchical management structure was addressed previously as an alternative to minimization of the effects of the division of labour and its resulting alienation (Savage, 1996).

the Knowledge Area entitled Project Management Integration. But it must be reinforced that the functional roles should be tailored considering that they vary depending mainly on the business structure of each TV channel, as well as on the budget available to the TV show – in general, a typical structure of a software development process should be used, articulated with the structure defined for TV production in each company[15]. Again, the notices contribute to justifying the aforementioned definition of a *basis process* in order to contribute to the definition of the required staff members (since that *basis process* identifies basic required roles and responsibilities). Also, the same individual can assume more than one functional role (once he/she has technical competence to execute the activities tailored in the process).

Advancing to the (ii) product, the "software project manager is confronted with a dilemma at the very beginning of a software project. Quantitative estimates and an organized plan are required, but [typically at that moment] solid information is unavailable" (Pressman & Maxim, 2015, p. 693). However, limited information at the beginning of a project is not exclusive in the case of software development projects (it is possible to state that uncertainties are quite common when most projects start). Thus, it can be considered that the information presented in the proposal of the TV show would be available to the software technical manager: such information is related to the activity (c) *To present the TV show proposal* showed in Table 1, and it constitutes the main reference to create the list of the initial software functional requirements (articulated with those suggested by key viewers), which establishes the basis for preliminary estimating and planning for software development. The proposed info would contribute to the definition of milestones to be presented in a preliminary schedule (via activity (b) *To develop preliminary schedule*) as well. Having the milestones defined and the preliminary requirements formalized, the initial software development schedule can be created, observing the milestones of the TV show schedule. Finally, the general budget of the TV show (activity (d) *To present the budget* showed in Table 1) establishes the general financial resources that can drive the app planning, and has – as mentioned – a direct influence on the software process tailoring to be used during the app development.

Considering both the initial information and the historical data of software projects, it is possible to present a proposal for the app development during the *Conception* phase, which requires revision and detailing during the *Pre-production* life cycle phase (although that phase is not addressed in this study). Despite the presentation of only part of the process, the alternative seems to attend not only the needs of software development process, but also that of TV production process – the technical managers (mentioned previously in item (i)

[15] It is worth pointing out that in relation to software development there is a wide range of bibliographies addressing the software development process. As example of development process that indicate disciplines/phases to be executed, one can mention the *Unified Software Development Process*, worldwide known by the software development community,, which presents the disciplines/phases Requirements, Analysis, Design, Implementation and Test (Jacobson, Booch, & Rumbaugh, 1999, pp. 109-313). Regarding alternatives to execution of such disciplines/phases, it is possible to mention technical strategies like the *Waterfall, Incremental, Evolutionary* or the *Concurrent* models (Pressman & Maxim, 2015, pp. 41-58).

people) would be the responsible for each *project*, and the detailed data would be presented to the TV show senior manager to decision making (encompassing, for instance, deadlines, budget and/or requirements negotiations).

The definition of the (iii) process to be followed, considering need "to select the process model that is appropriate for the software to be engineered by your project team" (Pressman & Maxim, 2015, p. 694) can be directly related to the activity (c) *To present the TV show proposal* showed in Table 1. The defined software process – which typically constitutes a tailoring in relation to a known and used process, and tends to be adapted to each project scenario (Chrissis, Konrad, & Shrum, 2010) – exerts direct influence on the resulting product, as mentioned. The software process tailoring is a task whose execution is headed by the software technical manager that proceeds with the tailoring considering the risks associated with both the TV show technical manager and the senior manager. When issues are identified, negotiating a solution occurs between the project managers and the senior manager.

Regarding the (iv) project, in the case of software development, it is usual to list aspects concerning the incomplete scope definition, as well as poorly management of changes (for changes related to technological definitions, business needs and project sponsorship) as key factors that tend to generate problems for the software development (Pressman & Maxim, 2015). Beyond these items, one can also mention aspects related to lack in deadlines definitions, unappropriated competences of team members and difficulties in learning with the past (in relation to hits and misses) as factors that tend to make project execution difficult.

With the definitions of items (b), (c) and (d) listed in Table 1 by the technical software manager (such definitions should be negotiated with the technical manager of the TV show and evaluated by the senior manager), it seems possible to equate the potential difficulties related to the integration and synchronization between life cycles using managerial activities in relation to *Conception* phase. Especially because

> the showrunner or TV show creator, while often celebrated as a singular author, is in fact notoriously buffeted by conflicting obligations to his/her own creative compass *and* to the many corporate players involved in maintaining the commercial engine and bureaucratic constraints of the television industry as a whole. (Mann, 2009, p. 103)

Regarding *Conception* phase in Table 1, the software process concepts enable identifying some of the activities that constitute potential procedural approximations (or points that enable the integration and sync) between the life cycles. Such approximations are presented in Table 2.

Table 2
An analysis of potential equivalent activities in Conception phase.

Activity category	TV production life cycle initial phases		
	Conception phase (activities of the basis process)	Activities of the TV production process	Activities of the app development process
Management	(a) To define required roles and responsibilities	To nominate the senior manager (executive producer)	–
		To nominate the TV show project manager	To nominate the app project manager
		To nominate the TV show project team	To nominate the app project team
		To nominate the TV show key customer	To nominate the app key customer
	(b) To develop preliminary schedule	To develop TV schedule (with *milestones*)	To develop app schedule (integrated with the TV *milestones*)
	(c) To present the TV show proposal	To elaborate the TV show proposal	To elaborate the technical/commercial app proposal
	(d) To present the budget	To elaborate the TV show budget	To define app restrictions (considering TV show budget)

Note. Adapted from Marquioni (2017b, p. 59) and Pressman & Maxim (2015, pp. 685-697).

Indeed, data presented in Table 2 enable considering that "the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities" (PMI, 2013, p. 63) seem to be applicable to the scenario, contributing to constitution of the foundation for a potential integrated and synchronized development between TV shows and apps starting from basic concepts of the Project Integration Management KA.

FINAL CONSIDERATIONS

The scenario of reconfiguration in the television ecosystem is complex – especially when considered the broadcasters' need to synchronize ads between multiple screens. However, with the existence of a *basis process* (Marquioni, 2017b) that systematizes the activities related to the TV production life cycle, it

seems possible to identify and organize the activities that need to be executed, enabling an effective alternative to managing the integration and synchronization between life cycles.

It is possible to affirm that one can define what could constitute a reference to the broadcasters' planning, monitoring and control of the activities to enable effective integration and sync between TV production and software development life cycles (considering both artifacts and processes). This approach seems to contribute to the development of the *in progress cultural reconfiguration* related to the complex linear TV system, as well as to other TV distribution platforms where there is software development related to TV content production.

Such definition seems relevant because viewers of commercial terrestrial television are subjected to *transformation* worldwide: they are mainly moving from a *tuned* audience to a *connected* one (since watching TV started occurring on distribution platforms different from the TV set, associated with multiple connected gadgets usage while watching). And this transformation apparently depends directly on the integration and sync orchestrated by the management perspective presented in this study.

Indeed, that *transformation* reinforces the continuous reconfigurations of television as a cultural form, and seems to contribute to justifying the need for the *Television Software Studies* definition as an extension to Production Studies theory. M

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