Taming the wicked problem of a drone ecosystem

The role of the media

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Abstract

This paper contextualises the alignment of the wicked problem of using drones as a form of leisure. The fast evolving spaces of drones and their different uses, from military, to logistics, to leisure create many intertwining structures within a larger ecosystem. This research offers new perspectives by considering the role of the media in assisting with alignment to try to tame the wicked problem associated with a drone ecosystem, the use of drones for leisurely activities. Guided by the principles of the Agenda Setting Theory (AST), the paper elucidates the way drone contents are presented across different media channels; how key themes emerge from the narratives within different media channels; and how (non)convergence of media contents relates to alignment of drone governance.

Introduction

In the last few years, drones have moved from their original use as military weapons of mass destruction, to their role as a form of leisure. However, the fast evolving spaces of drones remains under-researched in terms of their different uses, and how these should be aligned within what appears as an emerging drone ecosystem.[1, 2]

A wicked problem is a web of complex interactions related to perceptions that do not appear to form any coherent structure.[3] It is, as its name suggests, wicked because it may not throw up solutions,[4] is highly evolving in terms of its nomenclature,[5] and without an apparent finishing point,[6] or lends itself to a perfect solution.[7] When the problem situation is 'wicked', a network perspective may gain some traction in addressing such problem.[8, 9] Examples of wicked problems include the essence of collaboration and systems thinking in a networked environment,[10, 11] whereas the notion of a wicked problem within smart tourism ecosystems was further conceptualised by Gretzel et al.[12]

The methodology of wicked problem exploration[13] initiates the conceptualisation of the use of drones within a tourism business ecosystem as a wicked problem. Furthermore, recent research addressed the coordination of wicked problems within a tourism ecosystem,[14] arguing that a network approach may shed light on how to build platforms for gaining traction and synthesis in wicked problems. By visualising and investigating links between stakeholders and their vested interests, the peculiarities of the drone wicked problem may be better synthesised.

Furthermore, the adoption of drones for leisure by owners may be attributed to various reasons, such as excitement, curiosity, technological interest, self-expression and social motives.[15, 16] Prior to purchasing a first drone, it is likely that any potential owner will likely conduct an information search related to costs, functionality, and desired locations to fly the drone, among others. The probable information sources are word of mouth, magazines, news articles, websites, and social media communities. While these different media channels are easily accessible to any individual, little research has been undertaken to ascertain how media effects frame drone use, and whether there is a convergence of information related to addressing the wicked problem amidst the presence of drones.

This paper focuses on the manifestation of drone use in a leisure setting, how different media channel effects frame drone use, and whether there is a convergence of information related to addressing the wicked problem amidst the presence of drones. Drawing on the overarching framework of Agenda Setting Theory (AST), the purpose of this conceptual research is to elucidate the way drone contents are presented across different media channels, which key themes emerge from the narratives within different media channels, and whether and how (non)convergence of media contents relate to alignment of drone governance; with theoretical and managerial implications for stakeholders concerning drone use.

The paper is structured as follows: First, drones in a leisure setting and its stakeholders are discussed. Next, the drone business ecosystem is unravelled, highlighting inherent coordination and decision making issues and challenges related to drone use in a leisure context, identifying them as wicked problems. This is followed by how various media channels articulate drone messages to their respective audiences. Following this, a brief overview of the AST is provided. Finally, an example of how the media can be a useful starting point to lend alignment to the wicked problem of a DES is conceptualised, as well as areas for further research identified.

Drones in a leisure context

Leisure is best characterised as any form of non-paid, voluntary participation in work-unrelated activities that generally provide intrinsic rewards.[17] The term *drone* has been derived from a military connotation as a weapon of mass destruction, where some wars have featured the use of drones to deploy missile strikes on targets.[18] Another term associated with drones includes Unmanned Aerial Vehicle (UAV).

Since its original use, drones have evolved in terms of use and functionality, and have in the last few years witnessed steady growth as a form of leisure.[19] According to Smith,[20] it is forecasted that the drone market is likely to be worth US$127 billion by 2020. Some of the major players in terms of drone producers include Parrot (https://www.parrot.com/fr/en-au) and Da-Jiang Innovations (DJI) (http://store.dji.com/). An example of each company's most recent drone is illustrated in Figures 1 and 2.

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Fig. 1: Parrot Bebop 2 drone

Source: http://www.ckado.com/15528-home_default/parrot-bebop-2-fpv.jpg

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Fig. 2: DJI Phantom 4 drone

Source: http://schedule.sxsw.com/2016/events/event_OE05534

As illustrated in Figures 1 and 2, drone functionally has quickly outflanked its predecessors of remote controlled planes and helicopters. Drones not only incorporate visual capabilities through cameras and Go Pros, but are also integrated with augmented reality (AR), with ancillary features such as AR goggles as displayed in Figure 1. These contemporary developments help enhance the drone user experience to be more immersive, and enable socially constructed outcomes of leisure.

It is acknowledged that drone technology includes other non-leisure applications, such as conservation studies.[21, 22, 23] While extant studies demonstrate the use of drones across a wide range of industries and applications, there remains very little known about the notion of drone use in a social science context, such as leisure.[24, 25] Additionally, several reports of drone misuse have surfaced in news articles, raising privacy and safety concerns to the owner, victims and various tiers of legislation.[26, 27, 28] Notwithstanding such developments, policies and regulations surrounding drone use have only been initiated very recently, with countries such as the USA, Singapore and Australia at the forefront of providing some clarity as to rules and regulations.[29, 30, 31] Despite the best efforts of governments around the world attempting to provide some parameters and guidelines of use, the fast evolving drone environment suggests that any policies and plans are likely to be reactive, rather than proactive, attempts.[32]

A diverse range of stakeholders influence, or are influenced by, the presence of hobby drones for leisure. Figure 3 presents an overview of the different stakeholders relevant to leisure drone use.

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Fig. 3: Stakeholders of drones in a leisure context

Some stakeholders are vehemently opposed to the use of drones, especially commercial aviation operators who want them away from airports and regular flight traffic routes.[33] Likewise, several national parks around the world have erected signs prohibiting the use of drones for the safety and comfort of other park visitors.[34] However, some governments and businesses are welcoming drones to their destinations. For instance, Paris and Dubai were highlighted as successful case studies where drones were the focus of festivals and events.[35, 36] Evidently, there is a continuum of responses related to the receptivity of drones in a leisure setting, as demonstrated by the stakeholder groups. One of the challenges of addressing drone use in a

leisure context is therefore the lack of a uniform approach by different stakeholders as to their use and acceptance. This calls for some form of alignment of drone governance across the various stakeholders.

The drone business ecosystem

The drone business ecosystem consists of four main characteristics, each of which is elaborated on next.

Emerging from consumption to co-creation

Consumers of new technologies often find themselves in networked, active, informed, and involved user communities where they co-create their experiences. Consumers are being transformed from “passive audiences” to “active players” in consumer-driven value co-creation.[37] The emerging drone business ecosystems are a case in point and should be evaluated in the context of today’s knowledge-based environment, where the notion of value is inherently varied and multi-faceted. The customer becomes primarily a co-producer or co-creator, rather than a sales target, and tends to be involved in the entire value chain.[38] In nature-based leisure activities, value as a construct resides within an evaluation framework, in terms of time, space, and costs,[39] whereby each of the value drivers do not originate from one single company’s supply chain, but is composed of the contribution several ecosystem partners. Consequently, the value of a user’s journey or experience resides in the sum of these experiences. Murray and Howat[40] suggest that consumers buy or use a certain product, service or experience rather than another, by integrating their sense of cost and bene?ts into their value concept.

The premise that the consumer takes the role of a co-creator amongst a network of ecosystem partners creates challenges in the coordination of activities. The role of the consumer, the businesses and the governing structures like councils and regulators, create an interrelated network of interests. The problem of interacting through these different perceptions of what is important, creates tension between different parties, thus resulting in a wicked problem. The consumer view makes the problem even more complicated because it creates a problem of value co-creation. This means that businesses not only have goals to provide a service or deliver a product, but must be able to accommodate this emerging view of business. Such value co-creation within a drone ecosystem framework can be illustrated in the recent contribution of Cabiddu et al.,[41] who investigated how a platform (in this case IT-based) enabled value co-creation in its tourism supply chain on the island of Sardinia. Portale Sardegna, an Italian online tour operator, launched a new product, Open Voucher, with the objective to prolong the tourist season on the island, that is, to create a Sardinian tourism product capable of attracting tourists to the island during the low season (October to May). The new product allowed tourists to book the entire trip (including hotel and car rental) in real time and to plan a personalised itinerary allowing them to change hotels each day if desired. Portale Sardegna orchestrated resources (airlines, car rental companies, and participating hotels) to co-create value with customers who designed their itinerant vacation package. In a leisure context, drones have been used to help in terms of assisting hikers along the Swiss Alps.[42] This enables the destination, tour operators and visitors to co-create new hiking experiences by designing safe walking routes, and as a means of helping others lost in the forest.

Emerging from competition to co-opetition

Hearn and Pace[43] stated that a viable paradigm shift under the value ecology system is an act of transition from simple cooperation or competition, to co-opetition. Developing and managing networks presents considerable challenges for firms and organisations.[44] Capabilities and corresponding relationships are not owned and controlled by individual actors, though some may exert considerable influence. Rather, they are co-produced by the actors involved and developed in productive ways (or not), based on the interactions taking place over time, including both economic and social dimensions.[45] The role of collaborative relations has been the subject of much scholarly interest in tourism, as attention has focused on collaborative advantage as a key determinant of a firm’s competitive advantage in a brand and market proliferated industry.[46, 47, 48] Such developments are also witnessed within drone ecosystems as complex and mutable networks that evolve over time in response to technological, regulatory, environmental and organisational trends.

In a drone ecosystem, some stakeholders have more market power than others. In a tourism context, Tejada and Moreno[49] observe the emergence of networks as a predominant form of governance between firms in the tourism value chain, and distinguish three types of network relationships. Furthermore, "Focal Organisations" may play a crucial role in business ecosystems. They can improve the overall health of their ecosystems by providing a stable and predictable set of common assets. Focal organisations increase ecosystem productivity by simplifying the complex task of connecting network participants to one another, or by making the creation of new products by third parties more efficient. They can enhance ecosystem robustness by consistently incorporating technological innovations, and by providing a reliable point of reference that helps participants respond to new and uncertain conditions. Furthermore, they can encourage ecosystem niche creation by offering innovative technologies to a variety of third-party organisations. For instance, a focal organisation in the evolving drone landscape is *Airware*, a company that has developed a platform for drone users to map their flights, code safety controls and provide open-source analytics for all its users.[50]

From hierarchy to loosely coupled network relationships

At the heart of business ecosystems are loose networks of stakeholders who mutually impact and are affected by the work of others.[51] Business ecosystems harness such networks by creating "platforms" – services, tools, or technologies that other members of the ecosystem can use to enhance their own performance.[52] Applied to a drone setting, loosely coupled networks may, for example, exist in the form of social media platforms such as forums, which enable members to solicit, disseminate and transact on drone-related matters without any formal relations.

From self-interest to shared objectives

The defining characteristics of business ecosystems are "orchestration" and "mutuality." Enterprises in ecosystems operate out of mutual self-interest, rather than just individual self-interest. By so doing, they can create more value within the ecosystem by acting together, as compared to acting alone. "Mutuality" describes how much the ecosystem's formally or informally shared ideals, standards or goals enhance coordination in the network. In the context of an ecosystem, "orchestration" describes the degree of formal or informal coordination of interactions or collaborations among participants within the system. Orchestration may be informal, exerting influence through cultural norms and imperatives; or formal, enforced by explicit rules or the presence of an actual orchestrator — a focal entity that facilitates and manages ecosystem processes and interactions.[53]

Taming wicked problems within a drone ecosystem

The implementation and spread of innovation in leisure activities and new tourism experiences increasingly emerges through alignment within integrated supply networks, rather than through linear supply chains.[54] When new technologies are being adopted, as is the case with drones, partners in requisite supply chain networks engage in new ways to achieve their commercial and non-commercial objectives, extending their business network into a Value Ecology or Business Ecosystem.[55] In a drone business ecosystem, competition is complemented by an increased cooperation to boost agility, flexibility and efficiency, often leading to an environment of co-opetition.[56] Such an ecosystem can be complemented by a process, technology and governance infrastructure (platform) aimed at creating an operating environment for the networked individuals and organisations that supports cooperation, knowledge sharing, development of open and adaptive technologies, and evolutionary business models.[12] Drawing on the work of Arnegger et al.,[57] a drone ecosystem is conceptualised through a complex combination of organisational resources of many stakeholders, and increasingly through networks that allow for flexibly restructuring and re-aligning resources of each stakeholder toward common objectives. In such a network, an individual's or organisation's experience depends also on the behaviour of other stakeholders, and vice versa.[58] Drawing the precise boundaries of an ecosystem is impossible, rather, partners in a business ecosystem must determine the dependencies that are most critical. For example, a healthy business ecosystem is shown by the network's ability to consistently align all required resources (technologies and nature) to transform them into an experience that is beneficial for stakeholders. Such alignment across multiple stakeholders is vital for the business ecosystem's success, as it poses a range of challenges akin to a wicked problem. As applied to the drone business ecosystem, with its transitions from customer to co-creator, from product value to network value, and from simple cooperation and competition to co-opetition; stakeholders may not always agree about goals and objectives, let alone the processes to reach and implement them. Mutual understanding may not always be present.

In view of the characteristics of the inherent drone business ecosystem, the question arises how to manage the network of affiliated partners, operators, politicians, and government officials, so that they are all aligned in terms of drone use in a leisure context. How are resources allocated, and infrastructure managed with such a complex group of partners; i.e. how can the drone business ecosystem be effectively coordinated and controlled? This 'wicked problem' needs an effective way of management if it is to be harnessed.

Grint[59] argues that the more wicked a problem is, the more collaborative the resolution should be. Further, he argued that such complex problems require leadership and collaboration around possible points of agreement, which leads to exploring together,

rather than moving apart. This kind of leadership is implied by the drone ecosystem. It is important to note that Grint[59] is not suggesting collaboration as a possibility, but rather stating that without a collaborative resolution, it is impossible to get all disparate parties around the table. Recent studies have suggested that problem solving in such a context can best be managed through understanding of networks.[60, 61] These studies have reiterated that wicked problems can be assessed and discussed as a series of network interactions. This views the wicked problem as a series of tension points[13] that make up a whole map of problem interactions. Put simply, in this view the problem is a complex interaction of smaller problems that form a network of bigger problems. That is, the social environment is so complex that it creates a network of related concerns that develop into a complex network of related issues. Therefore, to dissolve a wicked problem, a transcendental approach must be undertaken, which is defined as a network approach that visualises and maps the tensions, tries to create elements of synthesis (new connections or new realities) that can dissolve the old, and aggregates or synthesizes into a new model or models. In this way, the network approach to wicked problems sees the connections to a problem not as a synchronised 'machine', but as an asynchronous phenomenon.

A drone ecosystem may comprise a close relationship of operators, governments and business 'systems', but the people who make the decisions socially construct and develop a platform for integration and problem solving. To this end, this research will illustrate how tensions can be explored and synthesised in a drone ecosystem through the roles of the media. So far, the general approach to a wicked problem has been to identify it, but very little effort has gone into understanding how to facilitate it. This research investigates next how various media channels may be used to align drone use governance across various stakeholders, thereby taming wicked problems within a drone ecosystem. This approach to utilise media sources (primary and secondary) as an exploratory method of inquiry is justified, given that empirical data on drones in a leisure context is almost non-existent.

Using the media to tame wicked problems

The media can be considered a central tenet where a sender encodes a message for a receiver to decode.[62, 63] As such, any sender will likely have a range of media channels to determine the best avenue for disseminating the message to its receiver(s). This research refers to three media channels in the context of conveying the most relevant and timely drone contents for its respective audience: official sources of drone regulators from five countries (Australia, the USA, Canada, Singapore and the UK); print media dedicated to aviation or hobby flying (e.g. Australian Aviation, Drone Magazine Australia, newspapers); and social media channels focused on drone enthusiasts (e.g. Facebook groups). These three channels provide a broad perspective of how the media portrays the presence of drones in a DES, and are published in the English language to avoid issues related to translation.[64, 65] While media channels may not only be distinctive in terms of their target audience, they also exhibit different attributes, as displayed in Table 1.

Table 1

Media channel attributes

Dimension	Official media	Print media	Social media
Aims/goals	Educate and regulate	Create awareness	Generate social network
Interactivity	One to many	One to many	Many to many
Credibility	High	Moderate	Low
Source identity	Known	Known	Often unknown
Speed of dissemination	Moderate	Slow	Fast
Cost of production	High	Moderate	Low
Lifespan	Medium-term	Short-term	Long-term
Global orientation	Fragmented	Reproduced easily	Widespread

Such media channel characteristics are important to recognise as an audience decodes messages, and one deploys AST in the use of media channels to tame wicked problems within a DES. Lieb[71] asserted that wicked problems are fast evolving issues and therefore any proposed solution will likely be a work-in-progress. Taming a wicked problem in the context of drone use can be considered a problem of stakeholder engagement. In a consensus-based approach for problem solving, one would find a commonly agreed consensus between stakeholders in the final solution. However, this does not appear to be case with drone use. Instead, stakeholders in a drone ecosystem are likely to face a gridlock resulting from differing opinions. Some scholars[13, 72] have unpacked wicked problems and found that the root of such entanglement lie in tensions arising from (mis)interpretations and bounded rationality. Nonetheless, other scholars contend that a solution then is the transient result of the collective

interpretation of a ‘social phenomenon’ that is subjective, and will vary according to the composition of the stakeholders that produced it.[73, 74] As such, knowledge constructed through language and semantics is given a meaningful representation through various media channels, and to various stakeholder groups that find such knowledge meaningful.

Next, each of the selected media channels is investigated in relation to the DES, and how resulting tension points inherent to wicked problems within the ecosystem can be displayed. By deploying the respective media channel to ease tension points, stakeholder engagement and alignment may be enhanced, thereby taming the wicked problem.

Official media

Official media channels have been used by government authorities to educate, inform and provide some regulation as to the use of drones in a recreational setting. Table 2 summarises various policies that have been initiated to regulate recreational use of drones in a few countries.

Table 2

Drone policy regulations by country

Country	Most recent policy	No. of pages	Website
Australia	AC 101-10 v1.2 (Sep 2016)	32	https://www.casa.gov.au/file/171461/download?token=rD99831v
Canada	AC 600-02 (Nov 2014)	6	http://www.tc.gc.ca/media/documents/ca-opssvs/ac-600-002.pdf
Singapore	Unmanned Aircraft (Public Safety and Security) Bill (Apr 2015)	31	https://www.parliament.gov.sg/sites/default/files/Unmanned%20Aircraft%20(Public%20Safety 2015.pdf
United Kingdom	Small Unmanned Aircraft – Air Navigation Order 2016 (Aug 2016)	3	http://publicapps.caa.co.uk/docs/33/InformationNotice2016073.pdf
United States	Small Unmanned Aircraft Systems (sUAS) AC 107-2 (Jun 2016)	53	https://www.faa.gov/uas/media/AC_107-2_AFS-1_Signed.pdf

Investigating the policies displayed in Table 2 shows some disparity in terms of the dates of release, and depth of content related to the use of drones across the five countries. Often, legal parameters of drone flying are summarised through infographics that condense the policies into a simple pictorial guide to show drone hobbyists how to go about their interests in a safe manner, as illustrated in Figures 4, 5 and 6.

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Fig. 4: Drone infographic – Canada

Source:https://www.tc.gc.ca/media/documents/ca-opssvs/dos-and-donts-flying-drone-safely-legally.pdf

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Fig. 5: Drone infographic – Singapore

Source: http://www.caas.gov.sg/caasWeb2010/export/sites/caas/en/ANS/unmanned-aircraft.html

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Fig. 6: Drone infographic – UK

Source: http://publicapps.caa.co.uk/docs/33/CAP1202droneawareNov15.pdf

The above official media illustrations spell out the regulatory frameworks that guide drone hobby use, and are worded in an instructional format (e.g. Do this, don't do that…). Yet, it remains unclear as to whether its intended audience (drone enthusiasts) are aware of the legal ramifications of such policies and regulations. Putting these in a DES context, official media tends to emphasise co-creation and alignment of official dimensions of the ecosystem, such as rules, laws and regulations. Even though they tend to be informal in the way they are communicated, they do impose boundaries onto DES participants. Through official media, it is mostly the interactivity of a few powerful stakeholders, with high credibility and highly recognisable identity, who characterise the communication. Information released through official media tends to happen at moderate speed of dissemination, often achieved through elaborate reporting, community surveys and consultation, resulting in high cost of production.

From an official media perspective, drones are encroaching private spaces of airports and homes, thereby needing some legislation to demarcate 'safe' precincts to fly. Figure 7 below provides a visualisation of potential tension points between various stakeholders, influenced by official media, within the DES.

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Fig. 7: Tension points — Official media

Print media

Next, print media, such as magazines and newspapers, are discussed as to how drones are portrayed, and how this may lead to tension points within a DES. Some print media paint the risks of drone use in in public spaces,[75, 76] alluding to the ignorance of users as to potential legal ramifications, which can be exacerbated using drone images. For example, in Figure 8, the image of the drone is portrayed as an aerial vehicle mounted with a large camera, which could insinuate that all drones are intended to act as a surveillance instrument. Such images can fuel concerns from magazine or newspaper subscribers to further resist their presence in a DES. The use of fear tactics is likewise observed in newspaper articles featuring drones. For instance, Koh[77] reported that drone enthusiasts were still flying their wares within five kilometres from a military airport. While hobby drones remain a security risk for high traffic airports such as Dubai,[78] the respective print media painted drone users as undertaking an illegal activity, and casted a highly negative image on people associated with such leisure interests.

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Fig. 8: Drone article within the Australian Aviation (Nov 2016 edition)

Source: Zupp (2016)

Other print media, such as *Rotor Drone* (http://rotordronemag.com/) and *Drone360* (http://www.drone360mag.com/), show drone capability in terms of aerial and visual functionality for drone enthusiasts. To further complicate matters, a professional photographer in Singapore recently posted an aerial photo of a major roundabout in a densely built up downtown area, which appeared to contravene laws related to drone flying. Yet, such effort was praised by its Prime Minister for its creative nature.[79] In this sense, print media is shown to be wider in terms of how it highlights drone activity — from one spectrum of perceived risk, to the other spectrum of innovation.

In a DES, print media tend to emphasize co-creation and alignment of general public-, enthusiast-, and expert- dimensions of the ecosystem, encapsulated in newspapers, magazines and expert publications. Print media often transcend competitive boundaries in an ecosystem, and have the potential to create a common understanding (or platform) for communicating DES issues. Additionally, print media facilitate interactivity of a range of stakeholders, both mass media and niche publications with, at times, inconsistent credibility, recognisability, and identity. Rich information is released through print media at relatively slow speeds of dissemination. Print media therefore espouse tensions between the innovative use of drones, and the challenges of their operation in public spaces. Figure 9 below provides a visualisation of potential tension points between various stakeholders, influenced by print media, within a DES.

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Fig. 9: Tension points — Print media

Social media

Finally, social media contents related to drone use in a leisure context, are discussed and illustrated through the distinct narrative emerging from social media groups about leisure drone activities. To provide a nuanced understanding of social media contents evolving over time, one Facebook group based in Singapore was selected to explore how drones were discussed across comments collected longitudinally. The Facebook group web link was entered into *Netlytic* (https://netlytic.org/home/), a software to assist with analysis of social network data.[80] Social media data was subsequently traced over a period of twelve months, resulting in the following trends emerging on the social media site, as shown in Figure 10.

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Fig. 10: Trend of words in Facebook drone group over a 12-month period

Figure 10 displays the relative magnitude of word use within the Facebook group, computed as the frequency of such words being mentioned among members of the site, revealing the top 25 most commonly mentioned themes or trends over a 12-month period. It is poignant to note that terms such as ‘regulations’ or ‘laws’ do not appear in the top 25. This shows that social media channels are more concerned with demonstrating the capability of drones, while also fostering the development of social networks.

As such, social media teases out the connections between people and their drone objects, which Davies and Niemann[81] refer to as the ‘*Third Space’.* This contested notion of space, spanning across private spaces of airports and homes, the innovative use of drones, and the challenges of their operations in public spaces, may lead to various tension points across the DES within social media discussions. Figure 11 below provides a visualisation of potential tension points between various stakeholders, influenced by social media, within a DES.

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Fig. 11: Tension points — Social media

Overall, the previous sections have shown the disparate manner in which drone contents are presented across different media channels, where each channel appears to showcase mutually exclusive narratives concerning drones in a leisure environment. More critically, the media channels raise the tensions related to the contested use of private, public and third space. Prompted by these outcomes, the next section will provide a brief overview of the AST, and how the media can be deployed as a useful starting point to address the wicked problem of a DES.

Agenda Setting Theory (AST)

AST was first proposed by McCombs and Shaw,[82] who argued that media channels do not merely disseminate news contents, but are also a vehicle to shape how different audiences think about issues. Since its inception, the use of the AST has been widely adopted to analyse public opinions related to politics,[83, 84, 85] contemporary issues such as same-sex marriage,[86] and corporate reputation.[87] The well-known framework of AST to explore a variety of applications was to ascertain how and what consensus is built around news media effects,[88, 89] in the context of traditional news media being framed from a Business-to-Consumer (B2B) approach of mass communication.

Yet, much has changed in terms of communication media channels since arrival of the internet. The online domain has transformed the B2C approach of news communication to offer other alternative forms, including Business-to-Business (B2B) and Consumer-to-Consumer (C2C). These changes have likewise been explored by other scholars who have found that interpersonal communication within the digital landscape have resulted in a paradigm shift of consensus-seeking to social networking.[90, 91, 92] Reflecting the reconfiguration of mass communication electronically, other scholars have advocated for further studies to be conducted on emerging topics that employ AST across contemporary media channels.[93, 94]

This research uses AST to develop a conceptual approach for deploying the roles of different media channels to create some alignment across a drone business ecosystem, characterised by inherent wicked problems related to coordination and decision making issues and challenges. This conceptual framework is illustrated in Figure 12.

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Fig. 12: Conceptual model of AST as applied to drone-related media channels

McCombs[95] proposed that the AST comprises four main steps:

1. Media conveys issue to its audience
2. Implications of the issue
3. Stakeholders and their vested interests
4. How to go about setting a common agenda

The broad principles of these four steps are next discussed in light of how the media can be a plausible tool to taming the wicked problem posed by the DES.

Discussion and future research

Collectively, the three distinctive media channels have portrayed drones as a leisure pursuit in a different light. From an official media perspective, drones are encroaching private spaces of airports and homes, thereby needing some legislation to demarcate ‘safe’ precincts to fly. Print media, in contrast, espouse the tensions between innovative use of drones, and the challenges of their operations in public spaces. Finally, social media teases out the connections between people and their drone objects. These disparate views create their own tension points across various stakeholder groups, thereby creating a wicked problem within the drone ecosystem.

To dissolve the wicked problem, the mapped tensions need to be synthesised across the three media channels to create enhanced or newly created connections that can dissolve the existing tension points. This could be achieved by deploying and

exploiting the attributes of each media channel in addressing tension points, and thereby aligning and engaging stakeholders within the DES. These are already characteristics of the first three phases of the AST in a drone leisure setting.

The critical point is therefore how to conceptualise the fourth stage of agenda setting in this context. To illustrate this, suppose one wants to achieve greater reconciliation between the concerns raised by personal privacy advocates and the free, innovative, new uses of leisure drone flying. In such a scenario, official media could be used to disseminate regulatory and legal implications (i.e. peeping across (above) the fence with a drone and which regulation applies) using newly developed infographics. Print media could focus on the new uses of leisure drone flying, while explicitly linking such uses to the implications for respect of privacy, and repercussions in case of a breach of such privacy. Social media could be deployed by 'starting' conversations (trends) that explicitly incorporate both innovation and privacy dimensions in the mix of conversations. Such an orchestrated approach could tame the wicked problem of disparate views across stakeholder groups by aligning and informing varying interest groups through different media channels. This emergent form of 'collaboration' is also witnessed in other wicked problems, such as ridesharing economies exacerbated by the likes of Uber.[96, 97]

While the approach presented offers a first stance of how different media channels can be deployed to align different viewpoints and stakeholders across a drone ecosystem, interesting streams of future research emerge. Various governance models could be explored in taming wicked problems across business ecosystems; varying from total self-governance, to fully regulated ecosystems. Another research stream may look at extending the proposed media channel alignment approach to the commercial use of drones, such as in logistics, real estate imaging, quick service delivery, and the like. Other research could expand on the media channels themselves, including the use of radio. Interesting research could be done of drone ethics, whereby the drone is an extension of one's digital 'self'.[98] Additionally, further studies could explore how to go about formalising a focal group setting to govern wicked problems. This may entail the consideration of whom to include in the nomenclature of the group. Finally, survey based research across the various stakeholders of a drone business ecosystem may gauge the "degree of wickedness" of the issues faced (i.e. where to fly and how to expand this space, licensing/regulatory issues, (public) liability issues, privacy issues, safety issues), and where alignment is needed, and where self-governance may be appropriate.

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