



Considerations in the diffusion of a public traffic app for Metro Manila



Emmanuel Yujuico*

University of Asia and the Pacific, School of Law and Governance, Pearl Drive, Ortigas Center, Pasig City 1605, Philippines

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ABSTRACT

The proliferation of apps enabling motorists to access traffic information on the move introduces several intriguing possibilities for transportation authorities. In the expectation that public demand for these apps will increase as both road traffic and smartphone ownership rise, these tools invite consideration alongside other traffic management tools. Traffic app-specific considerations include increased motorist interactivity, consumer technology diffusion, and institutional factors affecting the rollout of e-government initiatives. This article uses the introduction of the MMDA Traffic Navigator—a Manila-based, publicly developed traffic app—to illustrate these considerations. Additionally, app usage among residents of nearby cities constituting Manila's extended metropolitan region is considered. These considerations are subsequently classified using a 4E framework under *economy*, *effectiveness*, *efficiency*, and *equity* to inform other authorities' efforts to either incorporate traffic apps into overall transport planning or even take the initiative in developing them.

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1. Introduction

Residents of Manila reacted to bestselling American author Dan Brown's characterization of their city as the 'gates of hell' in his 2013 novel *Inferno* with a mixture of indifference, resentment, and indignation. Among its netherworldly attributes, Brown cites having to endure 'six-hour traffic jams'. Unsurprisingly, one of those who took exception by writing Brown an open letter was the chairperson of the Metro Manila Development Authority (MMDA), which coordinates planning for the sixteen cities and one municipality composing Metro Manila—alternately known as the National Capital Region (NCR). Pique at creative liberties aside, traffic is an admittedly daunting challenge for MMDA officials which they have tried addressing by various means—including a traffic app which is the subject of this article.

Increasing vehicular traffic in Metro Manila stems from factors common to fast-growing metropolises in the developing world. The continued influx of residents from the provinces, concentration of economic activity in major cities, rapid and unrestrained urbanization of surrounding areas, inadequacies in public transportation, unchecked growth in vehicle ownership, questionable driver discipline, and difficulties coordinating and managing traffic make alleviating congestion difficult. Metro Manila's population density swelled from 9317 persons/sq. km in 1980 to 19,297 persons/sq. km in 2012. Over the same period, its share of Philippine

GDP increased from 30.1% to 36.2%. Meanwhile, total registered vehicles rose from 446,142 to 1,904,305 as privately-owned vehicles (not-for-hire) increased from 391,178 to 1,717,453. All the while, surrounding areas that rely on the capital for providing employment have grown rapidly. Hence, the capital's challenging traffic conditions provide a situation receptive to the introduction of a useful traffic app.

This article proceeds as follows: Section 2 contextualizes this app's introduction by describing the MMDA's functions—especially relating to transport and traffic management—as well as Metro Manila traffic patterns and mobile phone usage in the Philippines. Section 3 recounts the genesis of the MMDA Traffic Navigator project: its conception and current implementation. Section 4 provides early findings on app usage and diffusion patterns in the extended metropolitan region while discussing broader repercussions of the introduction of a commercial traffic app, Waze, to the Philippine market. Section 5 derives public policy implications for the emergence of traffic apps in relation to a standard 4E framework for public initiatives concerning *economy*, *effectiveness*, *efficiency*, and *equity*. Lastly, Section 6 concludes.

2. Innovation context

2.1. The MMDA

The MMDA oversees metro-wide services which transcend political boundaries and whose expenditures exceed the individual capabilities of the seventeen local governments under its

* Tel.: +63(2) 637 0912 local 323.

E-mail address: yujuico@gmail.com

jurisdiction. Aside from transport and traffic management, it is also tasked with (urban) development planning; solid waste disposal; flood control and sewerage management; urban renewal and zoning; health and sanitation, urban protection and pollution control; and public safety during calamities or disasters. However, transport and traffic management represents the MMDA's most visible public face. MMDA traffic enforcers are ubiquitous on city roads, especially during rush hour.

Metro Manila resembles several other Asian cities which have implemented forms of unified metropolitan governance to deal with broader urban concerns. However, the MMDA is hamstrung by having to rely on the cooperation and budgetary contributions of its seventeen constituent local governments (Lacquan, 2005). A recently concluded, decade-long World Bank (2011) transport integration project cited coordinating difficulties between implementing agencies, local governments, and other private/public agencies due to political misalignments as well as the lack of timely release of budgetary allocations to the MMDA and the Department of Public Works and Highways (DPWH).

While its purposes are well-intentioned, the MMDA has therefore been handicapped by broader phenomena largely beyond its control including metro-wide sociodemographic changes, coordination difficulties among local governments and government agencies, and constant struggles for budgetary support. Upon assuming office in 2010, the incumbent MMDA chairperson has thus attempted to fulfill the agency's mandate against a challenging political-economic backdrop characterized by constant public scrutiny.

2.2. Traffic management initiatives

Since 1995, the MMDA has implemented variations on a Unified Vehicle Volume Reduction Program (UVVRP) based on private vehicles' license plate numbers. In its current guise, the number vehicle license plates end in [1&2 on Mondays ... 9&0 on Fridays] prohibits them from running between 7 AM and 7 PM during weekdays on busy thoroughfares, typically with a window of allowance between 10 AM and 3 PM. In addition, a uniform truck ban has also been used in various iterations since 1978. The current implementation prohibits vehicles above 4500 kg from running 6–10 AM and 5–10 PM daily except on Sundays and holidays. However, systematic studies on UVVRP and the truck ban's efficacy have not yet been conducted.

Earlier, the MMDA also experimented with using radio and television broadcasts to provide real-time traffic advisories to motorists based on its network of closed-circuit television (CCTV) cameras placed along Manila's main thoroughfares. From September 2007, it operated MMDA *Teleradyo* 1206 on the AM band as well as on a channel of a prominent Philippine cable operator from August 2008. However, when the current chairperson assumed office, he closed both down in August 2010 due to the expense of running them—reportedly one million pesos monthly [about US\$ 21,000]—and their perceived inability to widely disseminate traffic information (Santos, 2010).

2.3. Philippine mobile phone usage

The Philippines has been at the forefront of mobile phone innovation in a number of respects: its short messaging system [SMS] volume per capita is estimated to be the world's highest; it is a forerunner in using modern ICT for political mobilization as demonstrated by the ouster of former President Joseph Estrada in 2001; and it pioneered the use of cellphones for transmitting international remittances in 2005. Cellphones have thus become interwoven into the fabric of Philippine life, with the number of subscriptions exceeding the population (World Bank, 2012).

Aside from improving connectivity, cellphones have helped bridge deficiencies in Philippine infrastructure. Only a fifth of the population possesses bank accounts, while the rest are unbanked. Hence popular 'mobile wallets' have expanded the range of available financial services including retail transactions, utility bill payments, salary disbursements and cash transfers. There may be no better acknowledgement of their usefulness than national conditional cash transfers—welfare payments given to poorer households which meet education and health criteria for their children—adopting this platform for disbursement (Pickens, 2009).

Smartphones—defined here as cellphones with Internet access that are capable of handling advanced configurable applications ('apps')—have also gained acceptance. Illustrating Metro Manila's nation-leading status, the smartphone penetration rate in the capital region based on survey data is estimated at 53% compared to 34% nationwide (TNS, 2013). The diffusion of smartphones as compared to more basic feature phones is of particular importance here since traffic apps usually cannot run on the latter.

2.4. Extended metropolitan region

Another trend impacting Manila traffic has been economic and population growth in bordering communities. Spillovers from the capital, provincial residents in search of better livelihoods, ambiguities in Philippine zoning laws and inconsequential measures to limit urban sprawl have resulted in pronounced growth in the nearby provinces of Cavite, Laguna, Batangas and Rizal—together with Quezon, they constitute Region IV-A 'CALABARZON'—and Bulacan (Magno-Ballesteros, 2000). By 2010, CALABARZON overtook Metro Manila in population to become the Philippine's largest region at 12,609,803. Although CALABARZON also encompasses sparsely populated rural areas, most live in cities bordering NCR that have become economically resilient in their own right with the proliferation of special economic zones since the mid-1970s.

Urban sprawl in bordering communities has placed additional burdens on traffic management. With no light rail services running from CALABARZON to Manila, daily commuters rely on private cars and buses, choking roads leading into the capital. Additionally, trucks transporting finished goods for seaborne shipment via the port of Manila, the Philippines' largest, add to existing traffic volume.

3. App development

Like many other innovations, the MMDA Traffic Navigator emerged by chance. In 2009, the app's developer was still working in the private sector when the idea of writing an app for traffic advisory came to him while stuck in traffic. In June of 2010, he joined the MMDA with the brief of handling technology and communications. The idea for a traffic app began to take shape when TV5, a local television network ranked third in nationwide ratings, approached the MMDA requesting access to its live camera feeds which were already being shown by another terrestrial broadcaster. Wary of replicating similar content, however, the MMDA chairperson requested that TV5 create a 'value-added' proposition to benefit Philippine motorists.

When the network executive met with the MMDA's newly-appointed technology and communications adviser, their brainstorming led to a plan to digitize manually encoded traffic information written on an erasable white board based on CCTV feeds around the metro area. Aside from streamlining the process of data encoding, this system would also have the advantage of building a record of traffic information for future reference. As the television network became keener on this concept, they no longer sought to broadcast live traffic feeds but to instead digitize

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