‘Big data’ as a strategic enabler of superior emergency service management: Lessons from The New South Wales State Emergency Service

1. Samuel Fosso Wamba[i] (samuel@uow.edu.au), University of Wollongong, Australia & Rouen Business School, France
2. Andrew Edwards[ii] (andrew.edwards@ses.nsw.gov.au), The NSW State Emergency Service, Wollongong, Australia
3. Rajeev Sharma (rajeev@uow.edu.au), University of Wollongong, Australia

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A unique form of organization that has not received much attention is the emergency services organization, which is tasked with responding to crises and disasters such as floods, fires, hurricanes, tsunamis, and other natural and man-made disasters. Effective responses in such situations are reliant on the availability of archived information as well as on the effective real-time integration and utilization of data coming from various channels including sensors, satellites, social media feeds, photos, video and cell phone GPS signals or ‘Big Data’ (IBM 2012; Rich 2012). The effective management of these events also requires the collaboration and coordination of a range of government decision makers, emergency response stakeholders, and community-based non-government organizations (Chatfield, Fosso Wamba et al. 2010). The availability of real-time location-aware information, as well as the ability to effectively integrate and utilize information available with different autonomous agencies are key to effective decision making and resource deployment to respond to crises.

This paper draws on an in-depth case study of The New South Wales State Emergency Service (NSWSES) use of ‘Big Data’ for improved emergency service delivery to draw lessons for the effective use of ‘Big Data’. The NSWSES was formed in April 1955 by the New South Wales (NSW) State government, Australia, after the state experienced disastrous floods. The main objective for the NSWSES was to provide support to the community facing flood disasters. From those beginnings, NSWSES has now evolved to providing leadership and relief in various emergency situations such as storms, tsunami, and disasters management; resupplying the communities affected by disasters; launching air, flood, and road crash rescue operations; and developing community responder, vertical rescue, land search, evidence search, logistics support, and primary industries. The NSWSES is a geographically dispersed covering the entire NSW state, an area of approximately 800 642 sq. km.

What is unique about the NSWSES is that, apart from a small core staff, it is staffed entirely by volunteers: it currently has approx. 250 staff and over 10,000 volunteers. The volunteers undergo high level of training provided by SES and volunteer to participate in response events as they emerge. To provide a quality service to the people of NSW, the SES has established procedures and systems through which the state headquarters and all its regional offices can be contacted during and after normal office hours, thus providing for 24-hour emergency contact. In addition, all units accredited for general rescue are equipped with call-out systems. Further, the NSWSES has built a strong collaboration with key state players for emergency services delivery. For example, in close collaboration with the Bureau of Meteorology, the firm tackles essential issues such as the development and dissemination of official flood and storm warnings. It has also developed IT capabilities to maintain a bidirectional direct link between its website and the Bureau of Meteorology website during major operations, the final goal being to offer the public a real-time access to accurate weather or emergency information. The same capabilities allow the NSWSES to share resources (humans and assets) with other states during major disasters events. The organization has been aggressively using cutting edge tools and technologies such as paging, telephony, radio, spatial systems, enterprise resource planning (SAP), communications, and mapping tools, in order to provide improved capabilities to its volunteers during emergency response operations. A typical response operation would involve multiple information gathering, processing and dissemination technologies.

Emergency response operations are directed from a command control centre at the NSWSES headquarters. A dashboard is a key resource employed by teams coordinating responses to specific events. Among the data elements displayed on the dashboard is real-time data coming from the Bureau of Meteorology through a direct link to display critical information on the dashboard. The relevant information is then routed via various channels, including the NSWSES web site, twitter account, radio, and Smartphones to the dedicated set of stakeholders. These include the front-line volunteers involved in the response operation as well as the police, the Roads and Transport Authority, and community organizations.

In October 2009, the NSWSES upgraded the corporate IT infrastructure to implement a now collaborative platform based on Microsoft SharePoint. In December 2009, it completed a successful implementation of the Emergency Services Shared SAP system with other two states emergency agencies to enhance their level of information sharing and collaboration at the local and state levels for improved service delivery: the Emergency Services Shared SAP system is currently using by about 95,000 staff members across the state to support their day-to-day duties within each location as well as on the field of operations. During the same month, the NSWSES launched a new collaborative platform to facilitate the collection and sharing of information among key stakeholders using Web 2.0 tools. NSWSES started embracing social media tools to expand the service's communication with key stakeholders during emergency events and to assist in a positive profiling of the organization and its members. More recently, it started a project of equipping all staff members in the five regions with Smartphones to support field operations while on the move. Other key elements of NSWSES's IT infrastructure to support its response capabilities includes computers and peripherals (over 1200 desktops & laptops, 20 servers, 800 uninterruptable power supplies), telecommunications infrastructure (over 450 Broadband modems, 246 Routers & Switches, 250 Network sites), and telecommunication devices (over 2000 Pagers, 2000 Mobile phones, 300 Smart Phones, 4200 Radios and 170 Satellite Phones).

Key insights from our in-depth case study indicate that creating and capturing business value from the 'Big Data', as it is the case at the NSWSES, can allow a real-time access and sharing of information across local and national government agencies for improved decision making to enhance emergency service response. For example, having real-time information on "who and where" is allowing not only the realignment and movement of firm critical assets across the state to deliver emergency service, but also informing firm strategic decision about where to invest in the future to develop new capabilities to reduce local community vulnerability. Another key benefit realized from 'Big Data' by the NSWSES is the improvement of intra- and inter-organizational transparency and accountability, which represent major issues in the government environment. Moreover, the ability of the NSWSES to handle and support data from various sources and formats (structured and unstructured), as well as to push 'intelligence' from these data to various channels so as to support emergency operation on the field, was a critical success factor in this process of creating and capturing business value from 'Big Data'. Another challenge was the design and implementation of the NSWSES 'Big Data' governance, which deals with issues such as trust, accountability and transparency in relation to the collection, storage and sharing of these data. Furthermore, this study highlights the importance of having a visionary CEO who is able, on the one hand, to reengineer the organization in order to implement innovative IT-enabled emergency service solutions that can leverage 'Big Data' capabilities, and on the other hand, to promote of the adoption and use of IT-enabled emergency service delivery among the staff members, most of whom are volunteers, and are therefore less sensitive to the mandatory adoption and use of IT. This case study also reveals insights with important implications for senior IS executives engaged in leveraging business value from the 'Big Data' in emergency service environments. The lessons learnt from this in-depth case study apply not only to emergency service, but also to other sectors, such as the healthcare, as well as to companies (e.g. multinationals) with complex enterprise architecture and multiple data sources that allow them to tailor customer demands in order to achieve a competitive advantage in the marketplace.

References:

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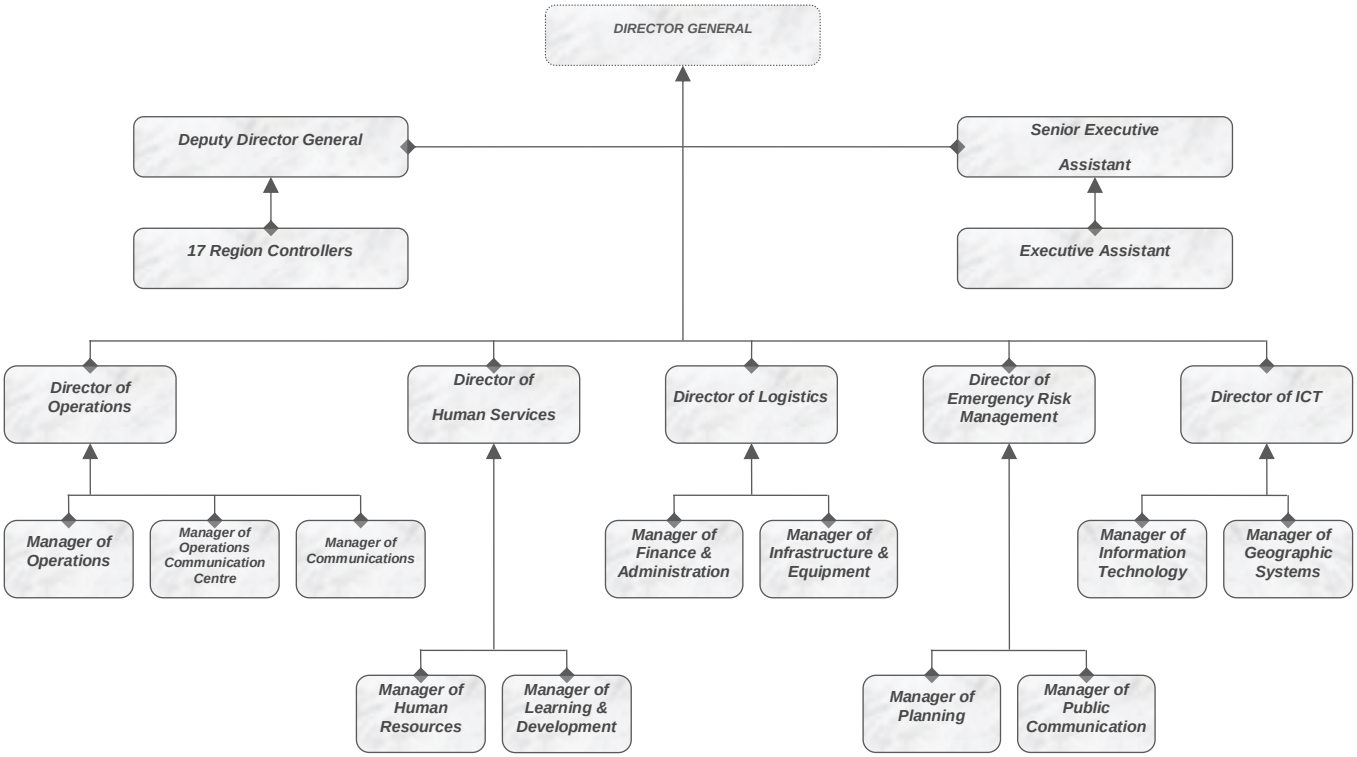
Figure 1: The NSW State Emergency Service organisational chart



[i] Corresponding author

[ii] Andrew Edwards is the Director of Information and Communications Technology at the NSWSES. He has been working for the firm since 1997.