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Amit Mitra
Cranfield University, a.mitra@cranfield.ac.uk

Laura Campoy
laura.campoy@uwe.ac.uk

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REVISITING PERCEIVED SUCCESS OF INFORMATION SYSTEMS: AN ANT INTERPRETATION OF IS/IT USE WITHIN COMMONWEALTH GAMES AT MANCHESTER, 2002

Mitra, Amit, Cranfield University, Department of Information Systems, Shrivenham, Swindon SN6 8LA, UK, a.mitra@cranfield.ac.uk

Campoy, Laura, University of the West of England, Bristol Business School, Operations and Information Management Group, Bristol BS16 1QY, UK, laura.campoy@uwe.ac.uk

Abstract:

Organiser perceptions of success of information systems in a major event like the Commonwealth Games is dependent on actual success as well as co-operation between a diverse range of human and non-human actors. Whilst most co-operative arrangements may involve contracts and plans, emergent actor expectations tend to shape outcomes that are recognised as successful. In the context of the Commonwealth Games held in Manchester 2002, it was clear that given the nature of the event with its fixed time line, opportunities to use evolutionary contributions were limited. After reviewing key works in IS success, the present paper uses narrative accounts of particular individual organisers by first estimating the fixed nature of contributions that were solicited from them. It then uses Actor Network Theory to develop a framework to examine how alignment of interests through both evolutionary expectations and generic sporting needs, contributed to the successful use of IS/IT. The present paper goes onto argue that whilst most technological and human competencies may be clarified and put together at the start of major events like the Commonwealth Games, IS/IT success in every major event is delineated by unique translations generic to the context.

Keywords – IS success, evolutionary IS development, translation, network alignment

1 Introduction

Reviewing primary research on Information Systems (IS) success literature shows that it was the late 1980s and 1990s when the bulk of research was published. Yet does this mean that IS success and for that matter IS failure have been adequately understood. Probably this will never be so as new types of IS are created to fulfil new expectations of developers and users, there will always be the need to contextualise and understand unique elements that contribute to success of particular systems. It is true that today a much larger volume of IS systems are used by people. The term IS for the purposes of this research includes people, processes and technology that have been used to plan and deliver to expectations for a major event like the Commonwealth Games (CWG). The kind of specialist wrapping that used to be prevalent for IS being commissioned in the 1980s and 1990s has also disappeared. Today IS is treated as something more integrated within everyday life and more importantly has influenced our lives in such a way that without them many activities would be difficult to envisage. Widespread advantages of internet use have also enabled to de-mystify systems development and consequent understanding of success. However, as long as IS fails, studying IS success will remain meaningful.

Whyte et al. (1997) mention that success does not mean a system producing the best but being capable of doing the job as expected and perceived by the user. So from such a perspective developing holistic understanding of what works when a large number of disparate actors are involved is what makes an investigation into success meaningful. Whilst we are in a world where technology is largely taken for granted when it is equated with other givens like running water, electricity and such like elements of life yet treating technology as neutral would be simplistic. Various research studies (e.g. Mitra 2001) have shown that there are reciprocal influences between technology and recipients of that technology.

The study using an interpretive paradigm will investigate through narratives of key personnel *how IS success got developed and delivered into the success of CWG*. Evidence collection for the study began at one end of a continuum with perceived expectations of key players and then tried to validate these expectations in the light of their experiences at the other end.

1.1 Perception of IS success:

Notions of IS success and IS failure are complex and therefore capable of rich interpretation. As alluded to earlier, a considerable body of literature has emerged in the area of IS success (cf. Delone and McLean 1992) together with a parallel stream and probably larger bank of studies on IS failure (cf. Sauer 1993). Preliminary consultation of these two streams of IS research, indicate little interaction between the two. Interestingly, only one of the numerous references in the original DeLone and McLean (1992) paper has 'failure' in its title and that title also contains 'success' (Robey and Zeller 1978). DeLone and McLean's (1992) paper contains virtually negligible content on IS failure and this seems to be the overwhelming characteristic of the IS success literature. On the opposite end of the spectrum, Sauer's famous work, 'Why Information Systems Fail: A case study approach' (1993) has two references with titles containing the word 'success' out of a total of about 200 besides there is not a single reference in common between DeLone and McLean (1992) and Sauer (1993) although six authors appear in both.

Our intention in this paper is to stand back from the debate about an exact definition and nature of IS success as there are many diverse ways through which success has been studied within the IS community. For instance, 'effectiveness' (Seddon et al. 1999), 'avoidance of failure' (Fortune and Peters 2005), 'attainment of purpose' (Whyte et al. 1995), 'integrated dependent variable'(DeLone and McLean 1992; Seddon 1997) are all constructs through which successful IS have been studied so far. However, interpretive research analysis of success is limited. Perhaps Kanellis et al.'s (1998) work is the only specific research using an interpretive paradigm to estimate success. Drawing on different

reference disciplines like philosophy, artificial intelligence, and organisational theory has made Kanellis et al.'s (1998) work uniquely useful. Another probable strength of the work is that they clarify success not to be an objective entity but something that is emergent as a result of the interplay between social and technical within a particular organisation. At the same time a relentless pursuit of 'fit' seems to pervade literature until recent times (see for e.g. Kanellis et al. 1998; Rai et al. 2003). Establishing such close connections between variables seems to be unable to capture richness of the concept of success as would be evident in a perceptual, associative context.

Therefore it would be useful to concentrate on the perception of IS success as a realistic starting point for this study. It is common knowledge that most observers considered the Commonwealth Games (CWG) held in Manchester in 2002 as a resounding success. At the time, the chair of the CWG organising committee, Charles Allen (2002) spoke of the games being, '…..the best ever Commonwealth Games' and 'one of the proudest moments for this country….' (Allen 2002) and Richard Caborn (British Sports Minister) said: 'The Commonwealth Games have shown that Britain can stage top-class events on the world stage' (Caborn 2002). Observers like BBC News (2002) and the Guardian (2002) concurred when they used phrases like 'Manchester's spectacular Commonwealth Games' and '… widely regarded as one of the most successful sporting events ever held in Britain,' respectively. Probably most crucially, the public voted with their wish to view the games on TV (over 1 billion viewers for some events) and in their attendance, with the organisers stating 'three times as many tickets were sold than at any other Commonwealth Games and the commercial income target of £51m from sponsorship, ticketing and broadcast had been far exceeded,' (Guardian 2002). Comments regarding IT features were equally flattering. For instance, Glick (2002) lauded success of the IS, by describing a ten day period during which IT operations worked with almost complete reliability.

The CWG held in Manchester, in the year 2002, brought together a huge range of actors, activities and organisations to enable delivery of such a major event. The staging of such global events does not have long planning cycles. People are brought together with the sole purpose of setting up infrastructure for something that is going to be dismantled after completion of the event. It seems that the only way to understand, replicate, and improve upon previous experiences of staging such games is through the use of past anecdotal accounts or other official documentation.

2 Emphases of research on IS success:

Despite the fact that most of the IS success research seems to have been undertaken in the 1990s, looking back it would be appropriate to trace some of the important contributions that such research has made so far. Arguably the work of DeLone and McLean (1992) is seminal as it inspired serious research into IS success that was hitherto taken for granted. In a sense, causal research with objective data considerations has limitations in understanding the true significance of success (cf. Seddon 1997) as there are studies (cf. Coe 1996) that demonstrate technical success when organisations have failed to accept software capacity and hence the system has been categorised as failed. On the other hand, positive perceptions get built up over a period of time when tasks that systems were created to carry out are actually delivered and hence dependence on the system grows. Such positive perceptions may also enable development of standards within particular industries. Table 1 below considers some of the important work on IS success, summarising primary contributions and implications of research on IS success.

Work	**Focus**	**Contribution**	**Implication(s)**
DeLone, W.H., and McLean, E.R. (1992).	Taxonomy of IS success parameters	First rigorous attempt to synthesise field to estimate success as a dependent variable	Set the scene for undertaking research on IS success by carefully outlining parameters to test and validate research
Ballantine, J., Bonner, M., Levy, M., Martin, A.,	Modelling of IS success from a perspective of	Evaluation of DeLone and McLean's (1992)	Post evaluation proposition of a new

Munro, I., and Powell, P.L. (1996).	completeness; recognition of the need to build success research from first principles; need to capture human elements	model of IS success.	model that extends the use of the DeLone and McLean (1992) model.
Seddon, P.B. (1997).	'Temporal and causal' interdependencies of the six categories of IS success in DeLone and McLean (1992) model.	Identifies ambiguities as a result of process and variance interdependencies of the six categories of success as propounded by the DeLone and McLean (1992) model.	Extends and re-specifies the DeLone and McLean (1992) model so that it becomes applicable to a larger range of research.
Garrity, E.J., and Sanders, G.L. (1998).	Represents a broad cross-section of research and view-points on IS success	Conceptual reference that can be used to address many of the issues related to IS success	Recognition of the need to develop theories and criteria to judge and measure IS success
Fowler, A., and Walsh, M. (1999).	MIS project based evaluation of perceptions of IS success among different stakeholders.	Interview of senior managers, system developers, and end-users including project managers within business units with links to issues appearing in literature.	Considerable perceptual differences among identified stakeholders
Rai, A., Lang, S.S., and Welker, R.B. (2002).	Validation using 274 questionnaire student survey of success models using both Delone and McLean (1992) as well as Seddon (1997) re-specified model.	Empirical and theoretical validation of DeLone and McLean (1992) and Seddon (1997) models in a quasi-voluntary IS use context.	Study supports both the DeLone and McLean (1992) model as well as Seddon (1997) model defining IS success and its impact on nature of IS use
DeLone, W.H., and McLean, E.R. (2003).	Update on the original understanding of the dependent variable given various new advances like electronic commerce between 1992 and 2002	Refinement of the original model developed in 1992. Discussion of the utility of the updated model to measure IS success.	Acceptance of the changing context of IS success with the large variety of systems including electronic commerce.

Table 1: Notable examples of research on IS success

In a complex world of many variables, research in general and socio-scientific research in particular it is difficult to establish strict dependency or independency of variables. Unlike in controlled environs like a laboratory where unnatural conditions can be artificially created and as a result, it is possible to first reduce the number of variables and second be able to control the type of influence between one another, in the IS/IT world of applied constructs, associative modes is common in developing understanding of research contexts.

3. Context of Commonwealth Games (CWG), Manchester 2002:

Traditionally technology in IS/IT implementation has been treated in isolation to other factors. In environments like CWG 2002 where a large number of people and technology needed to be brought together, such isolated understanding would clearly leave gaps in appreciation. Actor network theory (ANT) through its non-distinction of human and non-human influences offers a means by which success may be accounted for. Considering the significant role of expectations of individuals and the alterations that such expectations brought about to the resultant technological solutions, the opposite influence of use of technologies on human collaborative arrangements, as well as the retrospective construction of the case did indicate that ANT would be the most appropriate methodology to study

success within CWG. Latour (1999) talking about the actor network theory (ANT) context highlighted 'oscillation' as being an important dimension that defined trajectory. CWG could be said to be uniquely capable of embodying such oscillation whereby constant interaction between the micro world of the individual participant, organiser and official and the macro world of the audience, society, polity and even regionalism had to persist.

Use of methodology within the present paper was based on qualification of certain intrinsic parameters within the IS/IT development cycle. Avgerou (2002) has suggested that plurality of interpretations of 'inscription' may be put across, but properties of technical artefacts are liable to impact upon both the extent of socio-technical translations and the durability of consequent networks. In interpretive work like the present research, simultaneous concerns of plurality are also probable. However, the present approach of using the vocabulary concepts of ANT and then categorising actor motivations and connecting them to their experiences was able to appropriately outline trajectory of success. Given the fact that success was an overwhelming requirement of the organisation of CWG, other trajectories of IS/IT implementation that might have been traced through other interpretations were inappropriate. Taking a broad-based vision of the transition from inception to delivery and use of developed IS/IT within CWG was feasible since certain basic parameters were chosen to qualify trajectory. Bearing in mind the primary elements of Actor Network theory (cf. Latour 1999, Walsham 2001, Avgerou 2002) a set of common tools were used to create the dynamic by which trajectory could be discerned. Table 2 below outlines these tools.

Actor (or actant)	Both human beings and non-human actors such as technological artefacts
Actor network	Heterogeneous network of aligned interests, including for example: people, organisations and standards
Enrolment and translation	Creating a body of allies, human and non-human, through a process of translating their interests to be aligned with the actor network
Delegates and inscription	Delegates are actors who 'stand in and speak for' particular viewpoints that have been inscribed in them
Irreversibility	The degree to which it is subsequently impossible to go back to a point where alternative possibilities exist
Black box	A frozen network element, often with properties of irreversibility
Immutable mobile	Network element with strong properties of irreversibility, and effects that transcend time and space

Table 2: Key conceptual tools of Actor Network Theory

Source: Adapted from Walsham (2001)

In the context of CWG, it is clear that the consideration merely of IT infrastructure or the nature of software cannot explain success. At the same time, a major event like the CWG would have many different actors who might have had influences on its success. Using a cascade approach a series of actors were located who acted as subjects. In other words through the IT Director we located the main protagonists for interview and then during the interviews we would put forward to the subject about others that she/he may have known who might know more about the topics we were interested in. Narrative accounts of subject roles, expectations and experience were used to develop the network of aligned interests within the present paper. Further material that was gleaned through available CWG documents enabled the creation of categories that qualified the direction of trajectory. The appropriation of socio-technical success of CWG was based on the use of a methodological vocabulary described in table 3 below.

Actor (or actant)	Major CWG personnel responsible for delivery of results, testing of medical statistics, IT managers, venue managers
Actor network	Network of games federations, participants like athletes and judges of events,

	sponsors, software companies like Microsoft, technology suppliers like British telecom, officials within Manchester 2002
Enrolment and translation	Expectations of participants like judges of events, athletes and volunteers on the one hand and standards of available hardware/software that was used on the other that actually supported the dynamic of games implementation
Delegates and inscription	Broadcast engineers, IT application designers and analysts who ensured that expectations of participants were fulfilled at any cost managed to shape technological infrastructure
Irreversibility	Specification freeze that was used to ensure that additional requirements were not added beyond a certain date
Black box	MS WINDOWS platform on which the entire CWG software infrastructure was developed and implemented
Immutable mobile	Software standards and templates that were defined and inherited from similar previous events

Table 3: Description of adapted conceptual tools

As shown in table 3 above, a range of actors and actants played a significant role in enabling the description of trajectory. However, boundary specification was something that had to be retrospectively interpreted from available documents.

4. Mediation, engagement and inference

Two types of data have been used to develop the present paper. Extensive interviews/telephone interviews of six key actors central to the organisation of CWG have been used to develop and qualify expectations and experiences. Of the six, three actors were based in Melbourne, London and New York. While these actors were interviewed over telephone conversations, the others were interviewed through face to face meetings. These were recorded on tape and subsequently transcribed. Interviews lasted between an hour and two hours. The main reference point for further interviews, Terry has been formally interviewed on three occasions. Neil (based in London), Mark (based in New York) and Susan (based in Melbourne) have also provided feedback through email on issues both prior as well as after formal interviews. In the case of Terry who was the technology director of CWG 2002 and Frank, the principal project manager from Microsoft, we also had access to their diaries and personal notes that they kept throughout the time. These are of course subject to non-disclosure conditions and hence we could not refer to these directly in this paper. These documents were very useful to get a picture of the many changes in plan as a result of new challenges that were constantly arising during the final stages of organisation of the CWG games. Secondary data was gleaned from 17 technical and non technical documents used by Manchester 2002 to develop an understanding of the fixed nature of developments. These also were provided to us under strict non-disclosure conditions.

Data collection began by clarifying the principal roles of the actors. It then went on to examine engagement through a couple of main lines of enquiry. The framing of actor engagement was dependent on a continuum of expectations and experience. In agreement with Star (1991) we felt that ‘standards’ and ‘identity’ were two important components of the study. Whilst there were generic expectations which may be equated to standards yet every individual tried to eke out some kind of evolutionary solution which could be equated to a search for identity. It seems that the success of CWG was dependent on the balance between the appropriation of culture and definition of new standards. IS developmental activities would usually conform to cultural norms. Some of these may be in contradiction to emergent evolutionary solutions, thus the need for a balance. Pattern recognition of the contents of the interviews enabled the development of the broad categories of timeline, cultural integration, management of complexity and regionalism. It was the use of these categories through which trajectory and in the process technological momentum (Bijker and Law 1992) could be

identified within CWG at Manchester. The present paper dwells on the primary aspects that were highlighted within interviews with six such key players within the organisation.

4.1 Fixed timeline:

Unlike most IT projects, where time slippage is common, systems for CWG simply had to be functional and effective on the date and time scheduled for launch of the games. Actor perceptions show that a fixed timeline necessity on the delivery date produced interesting improvisations. From a broadcast perspective, there were certain givens, in terms of who would be responsible to be the host broadcaster. A particular telecom provider company chosen by the organisation committee seemed to have scarcely any track record to be able to handle requirements. The company eventually went in to administration. This was an example of how the network failed to congeal. In the process, the obvious choice of a national provider [British Telecom] came to be the actual provider. However, throughout the time that the former telecom company was in the picture, the broadcasters (Neil) tried to work jointly, in some instances trading consultancy for infrastructural support, like use of the fibre optic network around Manchester. Such unknowns did impact in a way that actors had to improvise so that loss of time could be recouped.

According to Neil, athletics is usually scheduled towards the end of Commonwealth Games, however, in the case of CWG 2002 at Manchester, a major international event (European Athletics 2002) was going to take place soon after the completion of the games. This resulted in the athletics championship beginning at midday of the day following the Opening Ceremony. This proved to be a major logistical task to handle in terms of the dissimilarity of the two events. For instance, Richard mentioned that high jumpers when practising in the track area found that the wind indicators were encroaching and could hinder their performance. On the other hand judges would need to be able to read indicators to decide on actual performance. Positioning of instruments therefore had to be suddenly improvised, to cater to the needs of the participants.

Exact event scheduling is of crucial importance to broadcasters. According to Neil, 'improvisation emerged to cope with slips of the order of 10 seconds'. Neil also stated that 'schedules on live programme would not change an event just because something is not running on time'. It was usual in the case of CWG to drop a few 'nice to haves' to ensure delivery schedules were adhered to. Whereas in normal IT projects, there might be reasonable acceptance for even a 10-day delay. So CWG's timeline was an absolute prerequisite. It was clear that improvisations developed to cope with minor delays in live programming of activities.

Whilst Terry and other members among the organisers understood that scope had already been frozen and signed off, broadcasters (like Neil), sports organisers (like Richard) and even the systems people (like Mark) seem to have wished to revisit specifications until the final moments leading up to CWG's inauguration. According to Neil, a strict timeline produced different visions of contractual responsibility. Another issue brought to our attention by Neil was the extent of risk management that became necessary, post 11th September 2001. At least one live feed had to be constantly available even if there was a terrorist attack. Emergence of such requirements with the passage of time meant that contingency arrangements had to be created between host and client broadcasting infrastructures.

'As a project manager you look at flexing various parameters all the time you couldn't do so for CWG. Going forward we had 500 days to something. For us there was always this marker, are we doing the right thing? Are we being pragmatic? For us we started on a journey we ended up doing something completely different', was a comment from the project manager (Frank) from Microsoft that illustrates the wide variations through which an inviolable timeline was arrived at. 'We started off with the objective that we'll deliver consultancy support to Manchester 2002 – telling them how to use our products, getting the best out of those products, give them guidance and the understanding of how they could be pragmatic in what they were doing. It was all such that they would end up running the show at the end of the day. It would be over to them, they would run it and we would be a sort of like a third line help desk, sitting there – if there were any real serious issues they would bring it up for us.

‘About 6 to 8 months before the launch it became apparent to us that there was no way that we’d sit back and watch this ‘fail’’ said Frank. Thus demonstrating how enrolment tends to work in an environment governed by an inviolable timeline where the risk of failure is owned and managed by sponsors who have massive market based images to defend. Frank went onto state that ‘we kept on reviewing our role with Terry and his team and we ended up doing a lot more than we initially envisaged. Again an example of enrolment throughout the roll out of the final IS/IT solution that led to the success that CWG achieved in the end. ‘Manchester 2002 may have accepted a higher failure rate than we were prepared to accept – our brand was suddenly under threat’.

4.2 Cultural integration:

Development and delivery of IS for CWG 2002 in the space of a two year period seems to have involved the inter-working of an extensive range of groups. According to most actors interviewed, there was a certain inevitability of groups coming together with disparate working styles and orientations. Evidence of shaping of eventual infrastructure seems to be manifested through two types of enrolment. Firstly, teams seem to have accepted norms of contracts and obligatory responsibilities. Second, despite such acceptance several teams seem to have carried on with their styles of working, sometimes without the knowledge of the organisers of CWG. In the context of CWG, where success was essential, it was interesting to notice the development of inscription on the eventual shape of IS infrastructure that came to be used.

According to Neil, broadcasters had a completely different style of working. Whilst Manchester 2002 insisted on regular attendance of meetings and adherence to specific time targets, broadcasters were accustomed to a more evolutionary style of developing infrastructure. In the words of Neil, for some technical managers of Manchester 2002 (more attuned to using formalised procedures) broadcasting infrastructure was just another milestone that had to be in place by a particular date. For the CWG organisers, experimentation was problematic, whereas the principal broadcasters were more accustomed to working close to deadlines using evolutionary means of developing solutions. In the words of Neil, such formal procedures were quite alien. Again according to Neil, such a cultural difference remained throughout the time and helped to enrich eventual solutions.

Working with technology providers demonstrated a difference of cultural orientations with regard to both understanding of timescales and degree of urgency. In the words of Neil, ‘Freezing of scope early on worked against our culture - we were accustomed to much closer deadlines. We were opening up things were Manchester 2002 thought it was already signed off.’ Again according to Neil, Manchester 2002’s culture of risk management did influence groups like the primary broadcasters. This was seen to be an inevitable type of enrolment that was visible in actor expectations. Mark on the other hand spoke of a unique characteristic that, according to him, overcame most of the IT-related challenges. According to Mark, ‘most of the successes of a major event like the CWG came down to people and their motivation levels.’ Normally, according to Mark, many individual specialists are not interested in learning from others. As the specialists move from one international event like the Olympics to another, they tend to acquire a ‘know it all’ way of looking at obtaining conditions (Mark). Due to a good combination of both young and more experienced professionals in project and management teams it was possible to be flexible to expectations of different participants of CWG 2002. There was a lot of IT staff with substantial amounts of experience in quite ‘hands on’ positions. Such an operational advantage proved invaluable - even Terry in his capacity as the IT Director of the Games could be available to listen to individual needs of participants.

4.3 Management of complexity:

Staging the CWG is clearly a highly complex operation. Sources of complexity include the difficulty of learning from previous CWGs, the number of different actor groupings involved, the geographical issues and the diversity of time scales. The CWG takes place every four years, and it is consequently quite difficult to achieve any continuity in the organisational process, or easily to learn from previous

experience. Prior to the 2002 CWG in Manchester, games were held in Kuala Lumpur in Malaysia (1998) and Victoria in Canada (1994). The organisation of the KL Games was widely praised, but since they were organised largely by the Malaysian armed forces, relatively little documentation or experience have been available to the organisers of subsequent games. The lack of these "templates" for the next instantiation is recognised by those involved with CWG 2002 (Neil, Mark, Susan), and there is little doubt that the situation will be easier in the run-up to the Melbourne CWG in 2006.

A further issue is the high speed of development in computing technology, and the fact that broadcasting technology is a major beneficiary of this development. Even if information could pass readily from one set of games to the next, the period of four year is a substantial one in terms of the available technology. For instance, Manchester 2002 was the first games in which the Internet was widely used for result handling, and the first time that PDAs (personal digital assistants) were linked into the formal information system. (Terry).

The second major source of complexity is the number of actor groupings: these include the host city's organising committee, the international games body, the individual sports bodies, the host broadcaster, client broadcasters, telecommunications companies and sponsors.

The Organising Committee is essentially the organising City Council, in this case Manchester. The Organising Committee itself organised functions such as IT and the building or leasing and equipping of the various venues. The Commonwealth Games Federation is the worldwide organisation with membership drawn from each commonwealth nation. Each sport (17 at Manchester) had its own governing body at the national and international level (Richard). Broadcasters consisted of two groups - the host broadcaster, which is the broadcasting company given the broadcast rights within the nation staging the games, and client broadcasters, who include other broadcasters in the host nation, and all overseas broadcasters. Telecom companies provide cabling and networking facilities.

The relationship between these various bodies and functions is largely contractual in nature and itself highly complex. For instance, good video graphics are essential for modern TV coverage, and there may be some doubt as to whether this requirement should primarily be satisfied by the organising committee's IT function and how much by the host broadcaster (Neil). As described above, it has not usually been possible to learn from good practice or established procedures from previous CWGs, so the various actors have to re-develop and re-negotiate a suitable approach each time. It was stated by Mark that a crucial factor for success (and one that went well in Manchester) is a willingness to make changes and to continue to adapt to the complexity, by both the organising committee, and IT providers.

A third area of complexity is the number of sports with radically different requirements, and the resulting number of venues. The Manchester CWG comprised 17 different sports. For many of these, the events took place in the purpose-built stadium in East Manchester, but others took place in locations away from the stadium (Allen 2002) (around 15 in all) around Greater Manchester, and some from a quite different part of England (for instance shooting event took place in Surrey). According to Neil, there was need for extensive special provision, for instance in the cabling and IT provision for a number of venues such as sports centres and swimming facilities. One critical success factor in events of this type is considered to be testing, and often a full-scale test event is organised in a particular venue to ensure that, so far as possible, all eventualities are covered. The extent to which this was possible in Manchester was limited, simply because of the range of venues being used (Neil).

Finally, differing time-scales are themselves a major contributor to complexity. Broadcast engineers (particularly those involved in outside sports broadcasts) are used to very short time scales. Sports event are often arranged with only a few weeks notice, and many practical details can only be dealt with within a few days of the event (Neil) For instance, the previous event in the venue may prevent access for technical fit-up until a day or two before the event – an example of this was that athletics event started in the CWG Stadium the day after the opening ceremony, and extensive refitting work had to be done in the interim. Furthermore, broadcast engineers are quite used to dealing with sudden difficulties, for instance bad weather, sudden power failures or a digger uprooting data cables. On the

other hand IT systems are usually developed on a quite different time-scale, where requirements analysis may take place perhaps two years before implementation. This was found to be the case at the CWG, where it was necessary to attempt to freeze some aspects of IT provision at least a year before the games, partly for practical development reason, but also because the vital sponsorship deals for hardware and other facilities (without which the CWG could not survive) could only be sought once there was some clarity over the likely requirements. (Terry, Neil).

4.4 Regionalism:

Over its 72 year history, the CWG (formerly the Empire Games), has taken place seventeen times (Commonwealth Games Council for England, 2002): four times in the capitals/largest cities in the "Old Commonwealth"[i], twice in the capitals of "New Commonwealth" nations, and the remaining eleven times in provincial "Old Commonwealth" cities. The 2002 CWG continued this trend by being held in a provisional city rather than in a capital such as London. It was interesting to note the views of the major actors questioned in assessing the extent to which this had an effect on the success of the CWG. It was felt by all that civic pride, particularly away from the capital was a strong contributory factor to the success. For instance, Neil felt that the rivalry of Manchester versus London led to a real feeling of commitment amongst all involved both before and during the event, and Mark pointed to the high level of volunteer activity, compared with Kuala Lumpur CWG in 1998.

According to Neil, there was a gradual growth in contribution levels as regional identities became better established. As deadlines approached the desire to make a regional difference in quality became more pronounced as greater support was useful in various dimensions. Terry talked about the huge range of volunteering that was used. For instance, feeding paper into printers, reporting faulty machines, troubleshooting more complex system problems were all different categories of support that volunteers provided. However, according to Neil, scale was also an issue here, as the amounts of support that would be necessary in an Olympic games would be significantly higher. Neil estimated that in CWG generated more than 1000 hours of live TV, whereas in the case of an Olympic games, it would be more in the order of 3500 hours of live TV coverage. It is clear therefore, that regional commitment did make a difference to the net support that was available to participants. Frank mentioned, 'when we got very close to the event date we wanted people to man some of the stands. So we asked for volunteers. Who wants to come and work in Manchester for a week? – Man the Microsoft stand, hospitality tent, PDA interactions, etc. help people around the internet cafes.

5. Conclusion

The study carried out for the present paper has established a couple of important pointers in understanding success in a major event like CWG. Firstly that success is dependent on the perception of both participants and spectators/viewers of the games. Secondly, that success is uniquely associated with the context of an event. So far as replication of success is concerned, complexities and challenges faced by actors and their translation to fulfil expectations of actors would be better guides. The present paper used actor network theory to interpret actor motivations and translation of expectations into experiences as human and non-human actors[ii] interact to form networks of heterogeneous entities. Whilst traditional positivistic research in technology has a tendency to edify successful developments and has tended to suggest linear, sequential paths to technological achievement, our research showed that successful implementation was purely dependent on people and their desire to improvise. Despite technical pressures of restricting scope creep, and a tendency to define requirements at every stage, technological solutions were not only non-linear but had a significant amount of experimentation embedded in them.

Within CWG, intermediaries embodied scripts that conveyed intended changes. For instance, PDAs introduced at the CWG carried inscribed new communication and work operations that defined a new role for officials within CWG 2002. Therefore in this context the PDA was the intermediary through which translation of work processes was enacted. In a complex and massive sporting environment of

CWG 2002 in 12 venues with 5,250 athletes, coaches and officials there were many different kinds of technologies that were used. In this context, overlaps between technologies related to IT and technology of other associated equipment, tracing boundary objects to outline enrolment and inscriptions could be really difficult. Indeed here the issue of inscriptions that have not been traced through objects that have not been included in the present paper might point to counter or plural interpretations. But from the perspective of in-depth interviews with principal actors who were responsible for organising CWG 2002, qualifications of boundary objects have been adequate. The present paper can conclude that whilst using a homogenous data model might have contributed to the clear definition of technological expectations, heterogeneity of enrolled actors brought about the success that CWG 2002 actually achieved. The present paper provides an illustration of how success may have been constructed through enrolment and inscription of expectations.

The present paper is unusual in its identification of 'success' as it has attempted to outline distinctions between the certainty of success and anything contrary to success. Whereas causal research might have looked for linear and sequential explanations of success, associative approaches like the current work involve approximations of motivations of developers, managers and users within CWG. Implicit among traditional use of ANT to assess technological implementation, is the indication of where 'black boxing' has occurred. The present study differs from such traditional authorisations, as derived black boxes may not be liable to be replicated in similar events of the future. But motivations to improvise are linked to the type of challenges that actors face. The latter might be similar in all major sporting events of the future. So from the standpoint of how actors went about addressing the tension between the defined and the evolutionary there is a significant need to disseminate lessons of future socio-technical arrangements of such broad scales.

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[i] The term "Old Commonwealth" refers to the UK, Australia, New Zealand and Canada. The other nations involved are usually referred to as the "New Commonwealth"
[ii] Non human actors here are used to indicate anything that acts or shifts actions.