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Culture and its impact on flight deck management - a comparative study of two airlines.

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Abstract

This paper outlines a study into the effects of culture on flight deck management by direct comparison of the results of targeted observations of flight crew behaviours in two airlines.

Introduction

Culture has been shown to have an impact on every area of human activity, because it determines the ways in which people solve problems (Trompenaars, 1993). Earlier research by Kluckhohn and Stroetbeck (1961) indicated that most societies are aware of all the possible solutions for life's problems but culturally prefer different solutions depending on their norms and values. If this is so, perhaps generic airline operating procedures formulated on the basis of the behavioural assumptions of one culture may be inappropriate when used by members of another culture. Clearly this has implications for both safety and efficiency of flight operations. Several studies have looked at safety in isolation, but this research considers both safety and efficiency together in a study of the effect of culture on the broader aspects of flight deck management.

Relevance

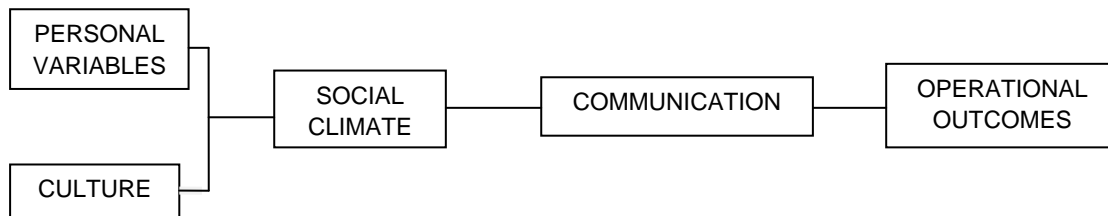
It is generally accepted within the aviation industry that over the last 30 years approximately 70% of accidents can be attributed to flight crew error. In an effort to reduce the number of accidents attributable to human factors i.e. pilot or crew error, (Crew Resource Management (CRM) programs have been developed as one of the major interventions in the present suite of aviation safety training measures.

Since the inception of CRM there have been conflicting views on the impact of culture on CRM with Yamamori and Mito (In Wiener et al., 1993) being of the opinion that no culture specifically fits the cockpit environment and thus CRM (and by inference aircraft operation in general) is culture free. This opinion is substantially at odds with the findings of Helmreich and Merritt who state that "the study of cultural differences has clearly discounted the misguided belief that the cockpit is a culture free environment." (Helmreich & Merritt, 1998) This latter view has a substantial body of supporting evidence from a variety of sources with cultural imperatives having been shown to have an impact on motivation, (Bond, 1988; Heine & Butchtel, 2009; Trompenaars, 1993) conflict, negotiation, (Barnlund & Yoshioka, 1990; Oetzel et al., 2001; Oetzel & Ting-Toomey, 2003; Trompenaars, 1993) change, learning, (Joy & Kolb, 2008; Heine & Butchtel, 2009; Scherer & Brosch, 2009; Trompenaars, 1993), efficiency, coordination, strategies, and employee inter-relations (Kagitcibasi & Berry, 1989; Trompenaars, 1993).

Other research by Redding and Ogilvie (1984) and Mjos (2004) has lead to a model showing the possible connections between personal background, culture, social climate, communication, and operational errors (Mjos, 2004). The model in figure 1 indicates that personal variables and culture underpin social climate which is a major factor in determining communication methods and styles. The effectiveness of communication ultimately affects both the nature and standard of operational outcomes.

Figure 1**Model containing the main variables relating to operational outcomes.**

(Based on Redding, 1984 & adapted from Mjos, 2004)

**Aviation safety and efficiency.**

Aviation safety tends to be reported using metrics associated with accidents. E.g., 0.41 western jet hull loss accidents per million hours or 0.81 western jet hull loss accidents per million sectors (IATA, 2009). There is however much to be gained from looking at the regional statistics. The IATA accident statistics are divided into eight regions and a comparison reveals that accident rates for Commonwealth of Independent States (CIS), Latin America and the Caribbean (LATAM), Middle East & North Africa (MENA) and Africa (AFI) are substantially higher than the world average (IATA, 2009). Even this data does not tell the complete story. For example Australia and Indonesia are in the same IATA region but have very different safety records. A further issue with safety statistics is that the accident rate recording hull loss, hull damage and loss of life does not reflect the complete picture of underlying safety. The rate of safety related incidents (near accidents, equipment failures, etc) also forms part of the safety equation however due to varying reporting standards from country to country, and even company to company. Reliable statistics are not readily available in this area but several issues associated with such incidents such as mis-communication, mixed mode mishaps, mis-interpretation of charts or instructions etc are areas that can be captured by direct observation methodologies.

From an Anglo-European perspective an efficient operation is one that optimises the use of all resources: time, fuel, staff, equipment etc. This process, in an effort to maximise profit through increased revenue and reduced costs, now includes a focus on reduction of carbon emissions. A reduced carbon foot print has until recently been merely a marketing bonus, but with the increasing global desire to reduce green house emissions, carbon output is likely to become a significant future cost, especially if proposed carbon trading schemes become reality. IATA sees the reduction of the airline industry's carbon foot print as one of the pressing challenges of the 21st century (Bisignani, 2009). It is likely that culture will have an impact in this area as operational, infrastructure and economic preferences have been shown to be to some extent culturally determined.

Research Methodology

The research methodology is based on the observation and comparison of line flight operations of two mono-cultural airlines, one being an Anglo-European airline and the other being an Asian airline. Direct observation is considered to be a reliable method of studying behaviour and has been used in studying crew performance in the Airline, Shipping, Space and Medical industries (Helmreich & Merritt, 1998). Manipulative skills, communication, leadership, management skills and general knowledge as well as safety practices, interface with automation, learning styles and human relationships can be observed and "targeted" by the use of a "data collection instrument". The instrument used in this study is based on the behavioural markers developed by the University of Texas for use in Line Operations Safety Audits and endorsed by the International Civil Aviation Organisation (ICAO Doc 9803, 2002). Using a modified Leichardt scale, these markers formed the basis for the behavioural and operational observations in this study.

Research to Date

An observational data collection project has been launched on a mono-cultural Asian airline. Approvals are presently being sought to conduct a similar data collection exercise with a mono-cultural Anglo-European airline. Once the data collection phase has been completed, after appropriate data cleaning, comparisons will be possible. The research is expected to deliver information that can be used in the improvement of both safety and efficiency within the aviation industry. It is also anticipated that the results may inform further research in other industries.

Transfer of Findings.

It is probable that any cultural aspects observed in the course of this study will have some general applications in other areas. In previous studies this has already been shown to be the case with cultural influence having a similar impact in more than one industry (Helmreich and Merritt, 1998; Sexton et al, 2000).

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