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AUTHOR(S)

L Firth, P Francis, David Mellor

PUBLICATION DATE

01-01-2004

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UNDERSTANDING THE LACK OF ADOPTION OF E-COMMERCE IN THE HEALTH SECTOR: THE CLINICIAN'S STRATEGIC PERSPECTIVE

Lucy Firth

*Dept of Information Systems
University of Melbourne 3010
Australia*

Peter Frances

*Dept of Information Systems
University of Melbourne 3010
Australia*

David Mellor

*School of Psychology
Deakin University 3125
Australia*

ABSTRACT

While the potential for e-health to grow the acceptance of and use of e-commerce is great, there remain barriers. While community acceptance of e-commerce models for health receives much attention, acceptance by clinicians of online medical applications is also a fundamental issue. A 2003 study of the adoption of online medical applications by Australian general practitioners (GPs, family doctors) showed that not only are very few using them, but also very few have plans to do so. This paper asks why this is so. Three possible explanations are investigated: that their current IS/IT aligns with their strategy, rendering change unwarranted; that they do not have the requisite means; and that there are non-strategic, non-means reasons. After an analysis of the relevance of concepts of strategy and alignment to the medical profession, relevant concepts are applied to the data. The findings are not encouraging for government plans to improve access, equity and efficiency through online medical applications. Moreover, the findings are generalisable to the adoption of e-commerce in contexts driven by factors other than competitive zeal.

KEYWORDS

Strategy, alignment, maturity, health sector

1. INTRODUCTION

The health sector represents some 8-9% of GDP in OECD countries. With growing concern for the health budget and aging populations, there is keen interest in developing cost-effective, access-enhancing approaches to: health records, medical consultations and professional development of staff (NOIE, 2002). Online solutions with transactions, which represent e-commerce in the health sector, are attracting attention. This may be particularly important in nations like Australia that have remote and regional communities with limited access to health services, and where extant medical professionals have poor access to training. The potential of online health and associated transactions has led many vendors to remark that the 'health sector is the new finance sector'. While normalising attitudes to e-health within the community may be a great barrier to this particular branch of e-commerce, this paper reports on an equally fundamental barrier – the fact that primary health services ('general practitioners' or 'family doctors') have not adopted online technologies as core to their operational strategies. .

Over the last decade, there has been growing interest in the alignment between organisational strategy and IT strategy. The leaders in the development of alignment theory include Henderson and Venkatramen (1994), Feeney and Willcocks (1998), Luftman (2000) and Chan (2002). They rely, to a large extent, on earlier work on strategy by Porter (1980), and McFarlan, McKenney and Pyburn (1983). A move to alignment and to a more mature alignment is taken as a driver for adoption of more advanced IS/IT technologies (Lee and Bai, 2003). These works have in common a focus on corporate, for profit organisations.

With the accelerating interest in the adoption of IT in the health sector (NOIE, 2002), there is a need for the relevance of these concepts to be assessed in the health sector context which may be less corporate while focused upon clinical as well as financial goals. Where those concepts of strategy are found to be inadequate, it is timely to identify more appropriate ones. As general practitioners (GPs) are the primary-level health service, questions of the relevance of the concepts of strategy, strategic alignment and alignment maturity to GPs' practices are of particular interest.

This paper reports on a study that asked 'why is it that very few GPs in Victoria (Australian state) use, or plan to adopt, online medical applications?' It does so by taking a strategic alignment perspective that queries the meaning of strategy to GP practice, the degree to which their current IS/IT use aligns with that concept of strategy, and the maturity of that alignment. Three possible reasons are identified and considered in light of the data. These are:

- Proposition 1. That the IS/IT currently used by Victorian GPs aligns well with their practice strategy, thus making the adoption of online technologies and applications unwarranted.
- Proposition 2. That the IS/IT used by Victorian GPs does not align well with their practice strategy, but they do not have the requisite infrastructure or equipment, or the means to acquire them.
- Proposition 3. That the IS/IT used by Victorian GPs does not align well with their strategy, but non-strategic and non-means related factors prevent them adopting online technologies.

The structure of this paper is that firstly selected theories of strategy, alignment and alignment maturity are briefly presented and considered for relevance to practice by the medical profession. Empirical data are then presented and analysed from the perspective of determining which of the above three identified reasons for non-adoption of online medical applications best suits the data. Finally, conclusions are drawn.

2. BODY OF PAPER

2.1 Theoretical issues

2.1.1 Theories of Strategy

According to Porter, strategy is "the creation of a unique and valuable position, involving a different set of activities... different from rivals" (1996:68). McFarlan, McKenney and Pyburn (1983) following from Porter's earlier (1980) work identify three fundamental strategies for competitive advantage: low cost, product differentiation and niche market. Later, Willcocks, Petherbridge and Olson (2001) expanded these to six strategic uses of IT: breakthrough unit costs for customers; service-based differentiation; micromarketing management, shorter time to market; transfer of experience; and new level of partnership. According to Luftman (2004) IT strategy is a set of decisions made by IT and functional senior management that either enables or drives the business strategy. The idea of strategy as a way of positioning the organization so as to attract customers and compete with rivals is central to these approaches.

A more inclusive approach is adopted by Andrews (1971) who identified four aspects of strategy

- A. What might an institution do? That is, what does the market want?
- B. What can an institution do? That is, what is the organisation's capability?
- C. What does an institution want to do? That is, what is the CEO's preference?
- D. What ought an institution do? That is, what is the organisation's social responsibility?

Porter (various years) and others focus on question A, and Luftman (2004) and others focus on questions A and B. Questions C and D have largely been ignored by the mainstream conventional writers on strategy (Liedtka, 1992), though it appears more recently in the 'triple bottom line' (Elkington, 1997; Birch, 2003). Andrews' richer concept of strategy may be relevant to GP practice where the clinicians have a preference

for quality clinical outcomes in terms of their professional practice and commitment to society (Roy Porter, 2002). This argument is consistent with Liedtka's (1992) work on strategy in hospitals.

2.1.2 Theories of alignment & maturity

There has been considerable research into the relationship between business strategy and IT strategy. Rockart (1979) identified the need to align the IS/IT to key information needs of senior executives as a key critical success factor within a model of organisational control by those executives. Rockart, Earl and Ross (1996) on the need for alignment of business and IT strategy. Henderson and Venkatramen's (1994) Strategic Alignment Model sets out the business and IT components, characteristics and their highly interdependent relationships. Chan (2002) suggests that successful alignment is difficult and dependant upon the 'spirit' of the stakeholders as much as formal processes. Luftman (2000) describes alignment as a 'harmony' between the business and its IT. He characterises the achievement of business-IT alignment as evolutionary, identifying five levels of alignment maturity. Luftman (2000) also proposes six key criteria by which to assess a business' current level of alignment thereby enabling the setting of targets for progression. According to Feeny and Willcocks (1998: 9) "The business and IT organisations, people and structures will have evolved through three phases, and will be mature enough in these areas to manage IT, including external IT service providers, maturely and strategically." Implicit in this model is a growth in the maturity of the business-IT alignment. According to Willcocks (2004), IT/IS evolves from low with ad hoc IT proliferation around tasks, to high where the CIO is the business innovator and IS management is a core capability.

Although ideally business strategy formulation can be informed by its IT management, ultimately IT strategy should complement the business strategy. Feeny and Willcocks (1998) assert that to leverage IT investment effectively there must first be a clear business strategy in place. Alignment occurs when an IT strategy is implemented to support that business strategy. This is not necessarily at odds with Lee and Bai's (2003) model of the evolution of IS/IT alignment (planning) which states that at intermediate and high levels of maturity, there is a bi-directional relationship between IS/IT and business strategy. At such levels of maturity, the IS/IT strategy can help suggest and develop business strategies, especially e-business strategies. At lower levels of maturity the focus is on technical issues (technology mode) and business issues (alignment mode) in which the IT/IS serves as a support for existing functions and strategy, respectively (see Figure 1). With evolution to the intermediate 'impact mode' there is a focus on competitive issues and a role for IS/IT in suggesting innovative sources of competitive advantage. This bidirectional effect continues in the higher stage of evolution 'fit mode' in which organisational issues see IS/IT take a central role in learning, knowledge management and change management (see Figure 2).

The work of Lee and Bai (2003) fits well with Andrews' (1971) work on organisational strategy because it identifies the importance of 'organisational issues', including values, beliefs, style and culture to the highest evolutionary stage of 'Fit mode' (see Figure 2). Lee and Bai's work is reminiscent of Maslow's (1943) needs hierarchies in that the survival issues of technical efficiency predate the self actualising concepts of values, beliefs and power management.

2.1.3 Adopted framework

In sum, it is argued here that the work of Andrews (1971) has the potential to capture the salient strategic consideration in the professional contexts where commitment to professional standards and protocols are central to practice. As professional standards and protocols are central to medical practice (Porter 2002; Liedtka, 1992) Andrews' concept of strategy is likely to be relevant to GP practice in Victoria. Moreover, it is also argued that Lee and Bai's (2003) work on the evolution of IS/IT alignment is consistent with the work of Andrews. Therefore, the remainder of this paper works within the frameworks established by Andrews and Lee and Bai to analyse data with a view to answering the question: 'why is it that very few GPs in Victoria use, or plan to adopt, online medical applications?'

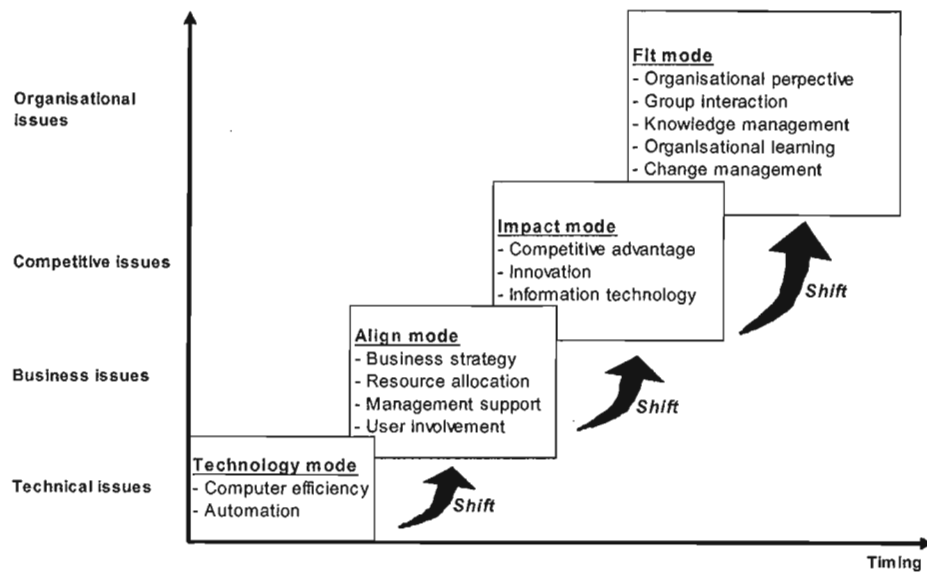


Figure 1. Evolution of IS/IT planning approaches. From Lee and Bai (2003).

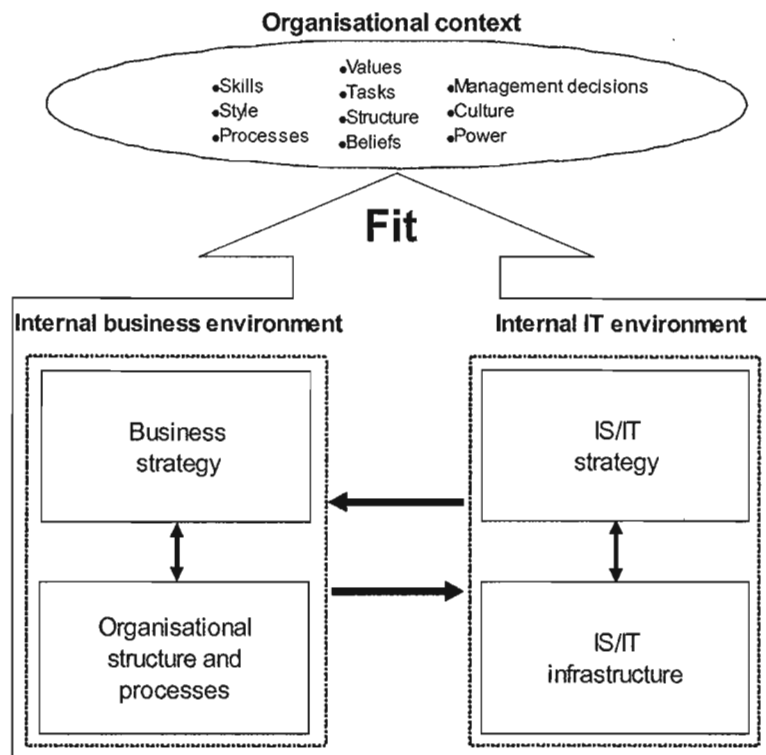


Figure 2. Fit mode. From Lee and Bai (2003).

2.2 Empirical Component

The empirical component of this paper comes from a study of Victorian GP adoption of online radiology images undertaken in 2003. While that study focused on radiology, the data gathered related to online applications in general. Those data were primarily gathered using a quantitative survey posted out to GPs and qualitative interviews of GPs. Because GPs interface with hospitals and specialists, hospital administrators and radiologists were also surveyed and interviewed. The data were then analysed statistically and by a content analysis of the interview transcripts. Combining the qualitative data with the quantitative data enabled us to gather an understanding of the main issues in technology adoption and an understanding of how prevalent those issues were.

To facilitate discrimination between our three propositions as to the lack of adoption of online medical applications, the material is organised here according to findings on GP strategy, alignment maturity, technological means and other factors that are not means-related and not strategy-related.

2.2.1 GP strategy

GPs interviewed by us voiced largely values-driven views, discussing issues of patient care (against trends in the environment) as areas for concern for them. The image of doctor as vocation came through clearly. When discussing changes to practice structure, staffing or processes, however, clinical or values-based decisions were less in evidence. GPs were more likely to cite cost-reduction as a driver for change, as in the decision of some to hand over care of patient medical images to the patients themselves. GPs who reported their introduction of this practice recognised the pitfalls of this change such as the increased risk of lost or damaged films. They had based the decision on having reached their limit to continue to find space on their premises for the storage; a cost-reduction decision.

It was observed that GPs operate in a highly modified market where government regulation, legal-ethical issues, insurance are all influential. These factors may contribute to the impression that GPs do not perceive themselves to be in the drivers' seat [or free to position their practices as they would like]. The influence of government is significant in the health sector. Government requirements for GPs to scan in patient records can be expected to lead to an increased use of information technology in even the simplest medical practice. These non-discretionary changes may take away attention of the GP from valuable, but less immediate, changes to their practices.

These instances suggest some bifurcation in GP practice strategy; with major considerations being efficiency-related and clinical. When it comes to their IS/IT strategy, it appears that GPs have tended to base investment decisions on efficiency and cost cutting opportunities. They do not appear to be investing in IS/IT for the purpose of promoting their clinical goals, in fact, very few if any saw the potential to improve their current clinical practices by going online. Exception to this were that they could see better patient outcomes from online test results.

In terms of Andrews' (1971), all four aspects of strategy are important to GPs. A full understanding of GP practice strategy could not be achieved, it is argued here, by focusing on only the first and second aspects, as is consistent with mainstream works on strategy. When it comes to GP IS/IT strategy, the focus is almost exclusively on cost-cutting. Given the market structure in which Victorian GPs operate (see below) cost cutting is not strategic in the sense of attracting patients and competing with competitors.

2.2.2 Alignment maturity

GPs have available to them an ever-growing range of hi-tech diagnostic and treatment options. While this IT revolution is not a recent phenomenon, and the GP has been ordering MRI scans and sophisticated pathology tests for some years, the IS/IT purchases of the typical general practice have been modest. While every GP in our survey had a computer connected to the Internet, none were using them for online medical applications. In fact, very few were using them for other than administrative and billing purposes. The few exceptions were using pharmaceutical look ups, and the Department of Foreign Affairs and Trade for travel warnings during the SARS epidemic. Therefore, it appears that GPs' use of IS/IT is consistent with 'Technology mode' of Lee and Bai's (2003) evolutionary scale (see Figure 1).

The lack of alignment between IS/IT and clinical goals was evident in a sense of frustration expressed by most of the GPs in our survey. They want to provide better clinical services to patients, but feel that the time

in which technology will support those goals is in the realms of science fiction. While GPs feel that they have all the professional expertise that they need for their own practice, they are not seeking to acquire or adopt applications that will improve their own performance. For instance, GPs are frustrated with film-based radiology images, which they recognise as arcane in a digital era. They would very happily receive radiology images and reports online in order to overcome problems of lost and damaged film. While online radiology images were seen as a more efficient use of their expertise, they were not driven to adopt that technology. That is to say that they did not necessarily appreciate the potential of IS/IT to achieve their clinical goals and professional values in a direct way.

While GPs do exhibit values-based views suggests that they would also consider the organisational issues of Lee and Bai's (2003) 'Fit mode' (see

Figure 1). However, they do not see IS/IT as a vehicle for the values and beliefs that Lee and Bai see as integral to the Fit mode (see Figure 2). Moreover, there is less to indicate that Victorian GPs value the business or competitive issues accorded to Align and Impact modes respectively.

Therefore, although the work of Lee and Bai fits well with that of Andrews in terms of acknowledging the importance of major stakeholder preferences (values, beliefs, etc), Lee and Bai's four mode evolutionary model does not fit well with the evidence of GP practice in Victoria.

2.2.3 Technological means

In research into the take-up of online medical image sharing (Firth, Francis and Mellor 2004), it was found that most GPs had sufficient IT infrastructure to access many types of images and reports. This does not support the second possible reason, that lack of infrastructure by GPs was a barrier to alignment. According to Bauer, Gai, Kim, Muth and Wildman (2002), while narrowband is adequate for some telemedicine specialties including teleradiology and teledermatology, other e-specialties require broadband with streamed video teleradiology (e.g. ultrasound) requiring the most bandwidth. NOIE (2002) takes a stronger position arguing that broadband is necessary for online medical applications in general.

While there may be some dispute as to whether Victorian GPs have adequate connectivity in terms of narrowband and broadband for some hi-end medical applications, there can be no doubt that the GPs in our survey had sufficient connectivity and computer equipment including software to enable most browser-based online applications. There was a perception among GPs in our survey that this was not the case and that the cost of upgrading would be prohibitive. This perception was most strongly held by those with concerns about the transition period in which paper-based and electronic information systems would be run in parallel and inefficiently.

It was also interesting to note that none of the GPs in our survey was involved in groups promoting online adoption. This even though several of them considered themselves to be technophiles, and one described himself as both a technophile and a convention junkie. That GP had heard of a push towards online applications when he was practicing in regional Victoria some years ago, but said that there was no longer talk of it.

Therefore, it seems that while Victorian GPs have modest IS/IT capabilities at present, they are likely to have the means currently to access and use many online applications. That they do not do so seems to reflect a lack of awareness of the technological requirements and cost implications of those applications.

2.2.4 Non-means, non-strategy factors

The lack of awareness among GPs of their current ability to use online applications reflects a sense that was obtained in the survey that Victorian GPs do not feel that they are 'in the driver's seat'. Rather, they are responding to various stakeholders including patients, their professional associations, and state and federal government, in a market in which they perceive themselves as powerless. Moreover, the market for GP services has characteristics that distinguish it from many markets. Demand tends not to be price sensitive within fee structures that prevail, with patients visiting GPs according to their perceived need for medical attention rather than because of price. While this has been contested in the media, demand for medical attention among the majority in developed nations is generally considered to be insensitive to price. It is apparently for all of these reasons the concepts of strategy and the strategic use of IS&IT have made few inroads into the healthcare sector (DHS, 2003).

GPs in our survey repeated expressed serious concern with security, legal and ethical issues of online applications. These concerns were not reflected in concerns about the current systems. For example, there

was concern that if images and reports were sent on line or stored on a server that there would be no way of knowing if they had been opened by the recipient. GPs who indicated this concern did not have concerns as to whether mail or courier delivered reports had been opened upon delivery. Also, those who were concerned about hackers were not worried about burglars reading paper files.

Victorian GPs are small to medium enterprises. According to DOCITA (1998) there is a link between size of organisation and IT use, with smaller organisations being less likely to use computers. DOCITA cites the Yellow Pages Small Business Index findings that 73 per cent of medium-sized businesses used computers "as much as possible" compared with only 40 per cent of small businesses. The attitudes of the CEO towards IT are even more critical in the smaller business, as their views are less able to be offset by senior advisors. CEOs who see the value of IT and will actively support the development of a robust IT management capacity would likely fit into Earl and Feeny's (2000) types as 'believer'. However, our survey suggested that Victorian GPs included technophiles and no luddites. Their love of technology and familiarity with its use does not seem to be overcoming the barriers that are preventing its adoption.

Other reasons given by GPs for not using online applications included a breakdown in patient rapport and engagement as the GP's attention was divided between the patient and the computer. Although vendors and radiologists in our survey suggested that GPs wanted to use film-based images and light-boxes for their mystique, this was not supported by GPs themselves.

Therefore, the non-means and non-strategy related factors preventing the adoption of online applications by Victorian GPs include: a regulated market place in which competition for customers and rivalry with competitors is suppressed; a sense of being constrained by professional and government bodies; a preference for 'bed side manners' as well as security, ethical and legal issues.

Upon completion of our survey, our impression is that it is these non-means and non-strategy issues that are most responsible for the lack of adoption of online medical applications by Victorian GPs.

3. CONCLUSION

This paper set out to evaluate three possible reasons for the low rate of adoption of online medical applications by Victorian GPs.

Proposition 1. That the IS/IT current used by Victorian GPs aligns well with their practice strategy, thus making the adoption of online technologies and applications unwarranted. Victorian GPs are, to a degree, values-driven in the management of their practices, however, their decisions regarding IT are mostly based on cost-reduction or efficiency. This does not support a conclusion of alignment.

Proposition 2. That the IS/IT used by Victorian GPs does not align well with their practice strategy, but they do not have the requisite infrastructure or equipment, or the means to acquire them. Victorian GPs generally have modest IT and IT infrastructure, however, most have sufficient IT to access many of the browser-based online applications. This does not support lack of means, although some GPs perceived themselves as lacking means.

Proposition 3. That the IS/IT used by Victorian GPs does not align well with their strategy, but non-strategic and non-means related factors prevent them adopting online technologies. Victorian GPs operate in a complex, regulated market, where concerns of competitive advantage are reduced. They are also poorly informed as to the realistic technology requirements for, and risks of, online medical applications. This over-estimation of the costs is compounded by a possible under-estimation of the benefits of such applications. Our research tends to support this proposition.

We have sought to understand the adoption of e-health in terms of business-IT alignment a framework informed by Andrews' (1971) broader definition of business strategy, and Lee and Bai's (2003) evolutionary model of IS strategic planning.

The following observations can be made:

1. Andrews' (1971) broader view of organisational strategy is useful as there is a need to consider clinical/medical goals in discussing strategy among GPs, concepts not accommodated in some other models of business strategy. The Andrews view enables analysis of GP practice strategy from a conceptual as well as empirical perspective.

2. Lee and Bai's (2003) four mode model of alignment maturity fits well with Andrew's but does not fit well with GPs. This is because GPs continue to see IS/IT in terms of administrative support with some information gathering traits. While the values and beliefs that are identified in Lee and Bai's 'fit mode', are consistent with GP's clinical goals, GPs do not see IS/IT as a vehicle for achieving clinical goal strategies.

3. Moreover, Victorian GP's strategy is at odds with Lee and Bai's overall evolution through stages of business strategy ('alignment mode') competitive advantage ('impact mode') because of the constrained context of the health sector market in Victoria

4. In the GP context extreme non-alignment is not a driver of change. A lack of harmony between current IS/IT use and GP's clinical goals may be driving frustration among GPs but this is not motivating them to act to achieve alignment.

5. In the GP context means (e.g. infrastructure and equipment) is not a driver of change. The adage 'build it and they will come' does not capture the dynamics of online medical application adoption by Victorian GPs. However, uncertainty about means-related issues of technical requirements, cost of equipment and potential impact on practice expenses, was a barrier.

6. If government wishes to see online medical applications in wider use, for reasons of equity and improved public health, they will need to focus efforts on identification and reduction of barriers as the introduction of such technologies is not seen by GPs as strategic.

7. Vendors of online medical applications will need to develop a greater appreciation of the goals of the GP and the apparent disconnect with IT planning.

We believe that these findings are generalisable to the extent that in organisations that are driven by motives other than competitive zeal, the adoption of e-commerce may be barred by a broader set of considerations than technical, cost and fulfilment.

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