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An investigation of factors affecting knowledge sharing amongst UK academics

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An investigation of factors affecting knowledge sharing amongst UK academics

Purpose: Research on knowledge sharing in higher education is extremely sparse. The purpose of this article is to construct and investigate relationships between knowledge sharing factors and attitude and intention to share of UK academics.

Design/methodology/approach: A research model and hypotheses were constructed from individual and organisational factors identified that affects knowledge sharing. Questionnaire data was obtained from 367 academics concerning their attitude and intention towards knowledge sharing. This was then used in a two stage structural equation modelling approach where the measurement model was used for confirmatory factor analysis then the structural model was used to measure and test the hypothesised relationships.

Findings: Findings indicated that in general, individual beliefs amongst academics were more influential on their knowledge sharing attitudes than organisational culture. Furthermore, leadership was the most influential factor within the overall organisational culture whereas autonomy demonstrated the weakest relationship. Belief in the possibility of rewards through associations was found to be a highly significant individual factor. The relationship between attitude and intention was relatively weak although still statistically significant.

Originality/value: The research demonstrates that management should ensure that departmental leaders promote knowledge sharing and ensure that valued rewards are linked to sharing within the department.

Keywords: Knowledge management, Knowledge sharing, Universities, Academic staff.

Introduction

As knowledge intensive organisations, universities play a critical role in knowledge creation

through research and dissemination through publication. In addition to knowledge possessed

by individual lectures and researchers, universities hold vast knowledge repositories (Rowley,

2000). Universities also hold a key role in transfer of knowledge by working with businesses

and other organisations to support learning through their teaching and research training

programmes and promote innovation and enterprise through initiatives such as Knowledge

Transfer Partnerships and Enterprise Centres. Furthermore it has been suggested that

increased knowledge sharing specifically in higher education can initiate improved decision

making processes that could speed up curriculum development and research. It could also

facilitate the retrieval and storage of institution specific tacit knowledge from key individuals

before they retire and assist with the formation of repositories for best practice in assessments

and use of technology (Kidwell, et al, 2000).

Consequently, it may be rational to expect that universities would take a proactive approach

to the development of knowledge management strategies, and that they would have an in-

depth understanding of how to manage and optimise the value of their knowledge assets.

However, Donate and Canales (2012) suggest that the knowledge management approaches

adopted by universities are either passive, or lack a consistent approach. There is a substantial

quantity of research in commercial environments that stresses the advantages of knowledge

management, such as sustainable competitive advantage, innovation and organisational

learning (Alavi and Leidner, 2001; Davenport and Prusak, 1998; Nonaka, 1995). However, in

spite of growing recognition of the role that knowledge management can play in public sector

organisations (Brown and Brudney, 2003; Sandhu et al., 2011) research into knowledge

management in universities is very limited.

An essential prerequisite for successful knowledge management is that the individual should

be ready to share their tacit knowledge with others (Hislop, 2013). Indeed, factors affecting

knowledge sharing have been subject to considerable research and many researchers have

recognised the central importance of organisational culture when designing knowledge

management strategies and seeking to promote knowledge sharing (e.g. Hislop, 2013;

McDermott and O'Dell, 2001). On the other hand, there is scant research on sharing

knowledge in higher education and much of the research that has been conducted on

knowledge management and sharing within universities reflects on the ways in which

universities differ from other working environments (Sohail and Daud, 2009; Howell and

Annansingh, 2013. Furthermore, Tippins (2003) argues that the reluctance to share

knowledge due to loss of status or power can be a significant factor in academia because

publishing primary research is an individualist task. This perspective is however in contrast

with Newman and Turner's (1996) viewpoint that knowledge should be shared across

disciplines and should be should be pursued as an end in itself.

Consequently, this research seeks to contribute to the literature by investigating the influence

of both organisational and individual factors on knowledge sharing between academics in a

departmental context. It builds on the findings of an earlier study which concluded that

academics had positive attitudes to knowledge sharing and a belief in the benefits of sharing

such as improved relationships with colleagues.

Specifically, the research objectives are to:

• Develop a new measurement model of knowledge sharing that is appropriate to the context

of universities.

 • Identify the organisational and individual factors that promote knowledge sharing in

universities.

• Investigate the relative impact of those factors on knowledge sharing in universities.

Accordingly, the article will briefly define knowledge management and knowledge sharing

then review literature on factors that affect knowledge sharing in general and in the context of

the higher education sector. A research model will be created and the associated hypothesised

relationships will be tested by utilising a two staged structural equation modelling approach.

Subsequently, findings, conclusions and implications for academic managers will be

discussed.

Literature review

Knowledge sharing is absolutely critical to the success of knowledge management initiatives

(Davenport, et al., 1998; Al-Alawi et al., 2007). This is because sharing knowledge is a

voluntary act and in order for the benefits of knowledge management to be realised,

employees need to be persuaded that it is in their interests to share (Hislop, 2013). Van der

Hoof and de Ridder (2004: 118) suggest that knowledge sharing is '…the process where

individuals mutually exchange their knowledge and jointly create new knowledge'. However

mutual exchange can certainly be limited by knowledge hoarding due to culture and values

(De Long and Fahey, 2000).

Furthermore, it is crucial to be clear on different types of knowledge. Explicit knowledge can

be relatively easily be transferred and collected, as for example in writing an instruction

manual, whilst tacit knowledge is situated in the heads of individuals and is conceptualised as nonverbalised, intuitive and unarticulated (Polyani, 1962); thus, it can be deemed more valuable and difficult to access (Reychav and Weisberg, 2010). Tsoukas (1996) however feels that both forms of knowledge are inseparable from each other.

As with other studies of knowledge sharing factors, organisational and individual factors will be grouped and discussed separately (eg. Connelly and Kelloway, 2003; Bock et al. 2005; Gagne, 2009) in the literature review.

In an organisational context, culture has been extensively recognised as central to sharing knowledge behaviour (DeLong and Fahey, 2000; Ardichvili et al. 2003; Kankanhalli et al. 2005). Similarly structure (Walczak, 2005), leadership (Bircham-Connelly et al. 2007)) and technology (Hislop, 2013) have been inextricably linked to knowledge sharing behaviour and the theoretical context for these organisational factors will be examined in the next section. Studies on individual motivators to share have often utilised the Theory of Reasoned Action as a basis for research (Bock et al. 2005; Kim and Lee, 2006) and individual sharing behaviour has been strongly linked to personal belief systems (Bock et al., 2005) Consequently, these factors will be explored and contextualised to the higher education environment. Lastly, research specifically focussed on knowledge sharing in higher education is considered

Organisational factors affecting knowledge sharing

There has been extensive discussion of the critical role of organisational culture in influencing the level of knowledge sharing (Connelly and Kelloway, 2003; Al-Alawi et al. 2007; Hislop, 2013). Alavi et al. (2006: 196) suggests that organisational values should be

aligned with a knowledge sharing culture and that a more "….open and supportive value orientations" would encourage greater sharing of knowledge. However, Cronin (2000) suggests that a strong recognised corporate culture does not exist in higher education institutions. De Long and Fahey (2000) advocate that some effort is invested in discovering the nature of subcultures, because distinct groups will have a different view about which knowledge is important within the organisation.

Gravett and Petersen (2007) depict a hierarchical, competitive and individualist academic culture where the focus for advancement was very much on publishing in international journals. Lee (2007: 42) points out that academic departments are '…idiosyncratic and complex', and further suggests that departments are sub–cultures that are influenced by the wider cultures of institution and discipline. Indeed Cronin (2000) suggests that the first loyalty of some academic staff is to their discipline. Consequently, affiliation to institution and discipline can also be considered to be central to academic culture.

Leadership also plays a pivotal role in encouraging and cultivating knowledge sharing behaviour through contributing to employees experiential learning, and also by providing opportunities for managing the processes whereby their staff share or transfer their knowledge (Bircham-Connelly et al. 2007),. The critical importance of the leader in shaping the organisational culture of an organisation has also been established (Schein, 1992; Oliver and Kandadi, 2006). Managers contribute to the development of IT systems, reward systems, opportunities for interaction, and the availability of time for knowledge-sharing (Sandhu et al., 2011). Indeed, when management is supportive of knowledge sharing, employees

perceive that a knowledge sharing culture is prevalent, and thus the example given by leaders and managers can be very significant (Wang and Noe, 2010).

However, the role of the leader can also be quite dissimilar in universities from that in other forms of organisations. Yielder and Codling (2004) suggest that there are two types of leadership in universities. An academic leader is professionally recognised and respected for their knowledge of their discipline and accepted by the team on the basis of personal power; accordingly, PhD supervisors and eminent scholars can also be perceived as leaders in academia (Bolden et al. 2012). In contrast, managerial leadership accentuates hierarchical position, job responsibilities, control and authority and power is embedded in the position rather than the person. Academic leadership is broadly assigned to the traditional more collegial university whereas managerial leadership is associated with the corporate model that many universities are moving towards (Yielder and Codling, 2004).

Lumby (2012) suggests that it is the academic environment itself that shapes the nature of its leadership. Indeed Lumby (2012) stresses that research evidence indicates a feeling amongst academics that leadership itself lacked importance and there appeared to be little agreement about what constitutes an effective leader. She stresses that the environment is unique because of diversity of cultures and in particular the fact that '....academics demand autonomy and protection' (Lumby, 2012:5).

Indeed autonomy has been a particularly strong tradition in the academic world (Cronin, 2000; Deem, 2004) and again could be considered a key distinguishing feature of the organisational culture in the academic world although it is less prominent in the post-92 university than in the more traditional pre-92 sector (Taylor, 2006). A high level

of autonomy has also been facilitated by the wide span of control enjoyed by Heads of Departments in universities (Rowley, 1996).

Indeed, organisational structures are also seen as impacting significantly on knowledge sharing (Walczak, 2005). Decentralised and network structures are believed to encourage sharing to much greater degree than mechanistic and bureaucratic forms (Peters, 1992; Handy, 1993). University structures invariably differ from those of most public and commercial institutions and Tippins (2003) points out that the functional organisational structure of higher education institutions could be a significant barrier to knowledge sharing, as could physical and psychological barriers. These could take the form of the individualism epitomised by the system of star academics (Cronin, 2000) and the tradition of academics working in isolation from each other (Collinson and Cook, 2003). It has also been suggested that academics can be viewed as individuals with loyalty to their discipline, their department, and to colleagues in other subcultures, although different departments may have '…opposing ideologies and values' (Lee 2007: 44). **Originally writing in 1852, Newman and Turner (1996) were concerned about the sharp divisions within universities into schools and faculties, believing that specialisation damaged the idea of a wide ranging and liberal education for students.**

Highly comprehensive ICT systems for knowledge sharing have been established in universities and indeed much early literature on knowledge management focussed on this aspect (Hislop, 2013). However, collaborative systems such as email and particularly Skype have provided a much richer communication experience. Consequently, usability of technology and the know how to use the systems are crucial to knowledge sharing (Omar Sharifuddin Syed-Ikhsan and Rowland, 2004). Furthermore, in a study of information sharing

by academics and administrative staff a lack of positive perceptions of information linked to

computers was shown to lead to a disinclination to use collaborative systems (Jarvenpaa and

Staples, 2005).

Values have also been widely recognised both as a critical component of organisation

culture (Schein, 1992) and a factor influencing knowledge sharing behaviour. Delong

and Fahey (2000) believe that values held as part of a cultural norm can affect decisions

about sharing knowledge, whilst Jarvenpaa and Staples (2005) conclude that shared

organisational values affect employees view of ownership of knowledge and in turn

willingness to share knowledge.

Individual factors affecting knowledge sharing

Whilst the organisational factors discussed above can set the context for knowledge sharing,

the process itself often takes place on a one to one basis between individuals. This is

particularly the case with tacit knowledge which is rooted in the cultural and social context of

the institution (Roberts, 2000). Consequently, the influence of individual factors that affect

knowledge sharing have been widely emphasised (eg. Cabrera et al. 2007; Wang and Noe,

2010; Gagne, 2009) whilst the importance of individual personal beliefs have been stressed

by Bock et al. (2005) and Lin (2007). These have been often been conceptualised as expected

rewards, associations and contribution (eg. Bartol and Srivastava, 2002; Cabrera and Cabrera,

2002; Cabrera et al. 2006; Lin, 2007).

Economic exchange involves participants calculating in a rational way what benefits and

costs may occur as a result of sharing (Blau,1964) and this process will take place only if

rewards exceed costs**. Thus extrinsic benefits are emphasised in economic exchange**

theory as motivators towards sharing (Bock and Kim, 2002) and are conceptualised as expected rewards.

As in economic exchange, social exchange presupposes that employees participate in exchange behaviour because they think their reward will justify their cost (Liao, 2008). However, Bock (2005: 92) points out that the advantages of social exchange cannot always be priced quantitatively, but involve '…personal obligation, gratitude and trust'. **Thus the benefits of knowledge sharing are in this case more intrinsic and have been conceptualised as expected associations (Kankanhalli et al. 2005). Lin (2007) discovered that intrinsic motivators such as associations with others were significantly linked to knowledge sharing behaviour whilst extrinsic benefits such as organisational rewards did affect sharing.**

Finally, expected contribution refers to a belief by employees that their knowledge sharing will result in enhanced organisational performance (Constant et al. 1996; Bock et al., 2005) and will gain confidence in their capability to provide knowledge that is valued by the organisation.

Knowledge sharing research in a higher education context

The existing research on the university sector has been largely focussed on Malaysia and involved the contrast between public and private universities. Findings from these studies indicated that incentive systems and reputation building were positively associated with knowledge sharing (Cheng et al., 2009), and a change from mechanistic to organic structure was also purported to support sharing (Sohail and Daud, 2009). More recent research by Ramayah et al. (2013) indicated that anticipated extrinsic rewards, anticipated reciprocal

relationships, sense of self-worth and subjective norm are critical factors for knowledge

sharing in academia. However, these studies had limited sample sizes and were situated

within a different educational system and culture. In the context of the UK, a survey by

Howell and Annansingh (2013) revealed a belief within post-92 universities that knowledge

silos were a characteristic of their environment .Moreover, the lack of systems and a

champion to encourage sharing resulted in scant motivation to share; a culture of guarding

teaching material was cited as evidence of this. In contrast, academics at Russell group

institutions were ready to take a leading role in the knowledge sharing process and

mechanisms for sharing such as research group meetings were already well established

(Howell and Annansingh, 2013).

Research Design

The research design draws substantially on the widely cited (eg. Kankanhalli, 2005; Lin,

2007; Chow and Chan, 2008) research into knowledge sharing behaviours conducted by

Bock et al. (2005).Thus in terms of individual factors, beliefs, rewards, associations, and

contribution were based on Bock's items. However, in the light of previous literature on

organisational cultures and the unique context of academia (Lee, 2007) it seemed appropriate

to capture a different range of variables from those used by Bock et al. (2005). This study

therefore augments Bock's (2005) research with items on leadership autonomy, affiliation to

institution, affiliation to discipline and technology platform

As with Bock's model, the Theory of Reasoned Action (Fishbein and Ajzen, 1975) and the

Theory of Planned Behaviour (1991) underpins research model design. **Both of these**

theories suggest that beliefs, attitudes, intentions, and behaviours can be measured

objectively and that beliefs affect attitudes, which in turn influence intention.

In the research study model, beliefs about the consequences of a particular action (such as knowledge sharing leads to intrinsic rewards) and the overall organisational culture are both purported to have an effect on attitude towards sharing. The subjective norm is positioned between these two variables in order to reflect the influence of normative beliefs and this is illustrated in the hypothesised relationships shown in Figure 1 below.

The theory of reasoned action assumes the centrality of intention to perform a particular behaviour and supports the notion that the harder one tries; the more likely it is that the behaviour will happen. Ajzen (1991) later expanded the theory of reasoned action to the theory of planned behaviour. Intention is still a critical component but the major difference is the inclusion of perceived behavioural control as an important predictor of intention. Bock's research and questionnaire constructs have been extensively cited and used in the development of other questionnaires (eg. Kankanhalli et al., 2005; Chiu et al., 2006; Petter et al., 2007; Lin, 2007) and are used here to inform the development of both hypotheses and questionnaire constructs. However, this study is limited to the context of organisations from the manufacturing and technology sectors in South Korea and Bock et al. (2005) admitted that the collective nature of Korean culture is also a research limitation when comparisons are to be made with similar studies. However, both the survey instrument and research model for this study have been substantially adapted and extended to reflect the UK academic context and thus negate as far as possible the effect of the Korean origin of the questionnaire. As a result some questions were amended and further questions were constructed to reflect the academic context.   It was felt overall that the benefits of using an available robust tested instrument outweighed the advantages of producing an original questionnaire. Indeed, Bryman and Bell (2015) suggest that using an existing questionnaire reduces the need for

piloting and a further advantage is that existing questions have been subject testing for
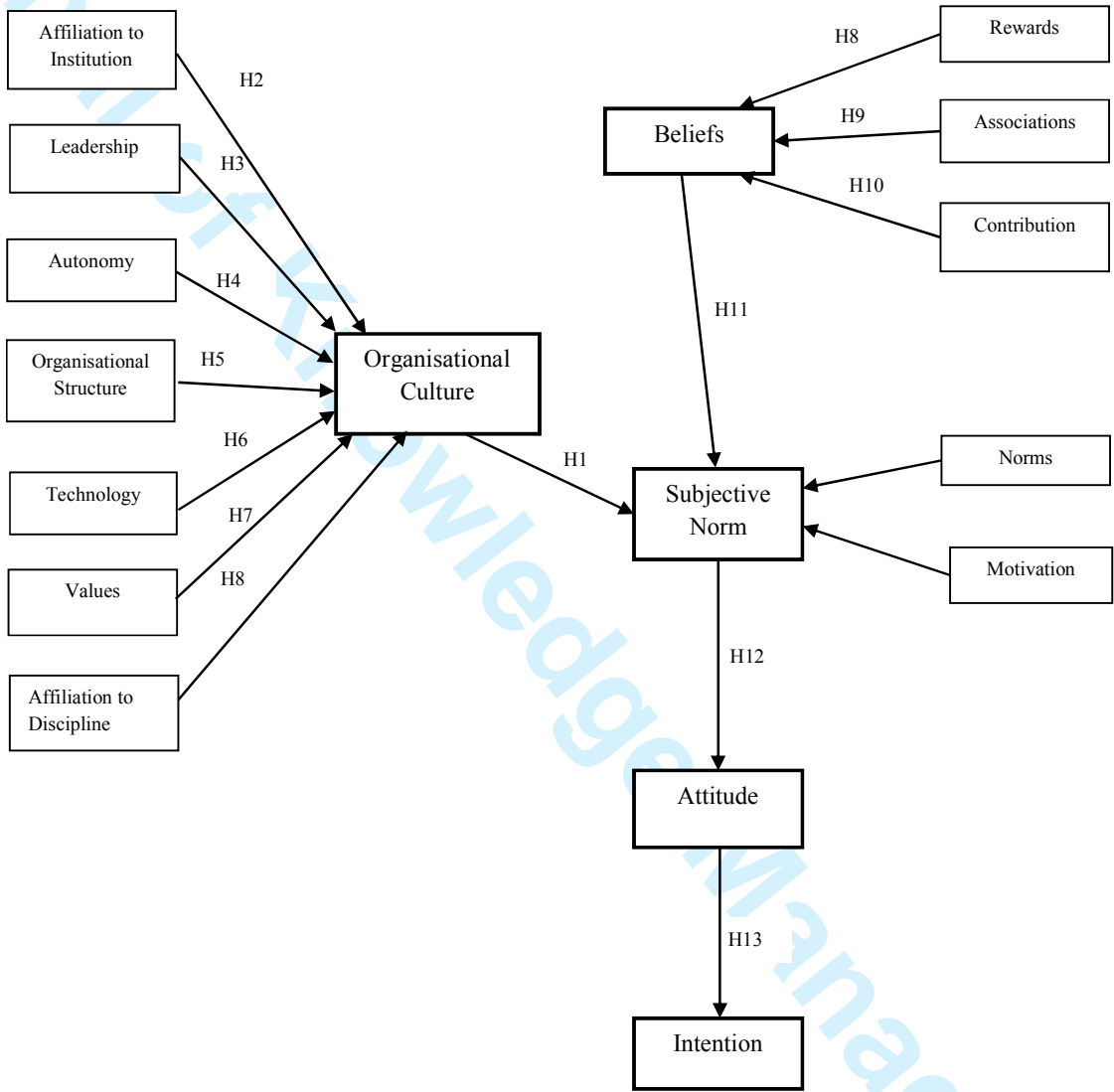
validity and reliability.

Figure 1 Research model

Research Methodology

Research context

The higher education sector in the UK is well established, and includes 159 higher education institutions of which 33 are specialist colleges. These employed a total of 198,500 academic staff in 2014-15 (Universities UK, 2016). Most of the universities are partially funded by the Higher Education Funding Council's for England, Wales and Scotland, but most also have significant income streams from their other sources, including public and private sector organisations, in relation to their research and knowledge exchange activities. Indeed, the government continues to see universities as a key driver of the knowledge economy and the intellectual and cultural achievements of the nation (Department for Business Innovation and Skills, 2016).

Kidwell et al. (2000) suggests that enhanced knowledge sharing has the potential to facilitate both curriculum development and research and in recent years, there have been a number of key government policy agendas that have influenced the sector These have impacted variously on teaching, learning, research and knowledge exchange. In respect of teaching and learning, changes in student fee structures and the introduction of the Teaching Excellence Framework, are leading to increased emphasis on rankings, reputation, and student experience (Department for Business Innovation and Skills, 2016). As far as research is concerned, the evolving Research Excellence Framework has increased the drive towards excellence and international quality research outputs, whilst the increasing concern with the impact of research has enhanced the focus on knowledge transfer, including collaboration with businesses, and delivering on societal, health and cultural benefits. Recently the Nurse Report has suggested that the Research Councils evolve into a single formal organisation to be known as Research UK in order to facilitate a more strategic approach by the governance

to research. A further suggestion is the formation of a ministerial committee to engage more

directly with the research community (Nurse, 2015).

Research design

The existence of a considerable body of literature on factors affecting knowledge

sharing in different contexts suggested a quantitative approach (Easterby and Smith et

al. 2012). Indeed, two thirds of the articles in Wang and Noe's (2010) review of

knowledge sharing articles were written from a quantitative standpoint. Although more

qualitative studies were suggested in order to illicit in-depth perspectives.

A questionnaire-based survey was deemed to be the most effective approach to gather a

profile of UK academics' attitudes and intentions towards knowledge sharing and related

factors. A survey was chosen because with little preceding research in the area, it seemed

important to amass an impression of knowledge sharing across a range of universities and

disciplines, and a potential to sample a large range of participants did indeed exist.

A questionnaire approach can be useful when resources are limited, a large sample is

involved, consent can be obtained and the nature of the data required and measurement

method is already known (Cameron and Price, 2009: Easterby- Smith et al. 2008). In this

particular case, the project was constrained by time and cost. Moreover, data needed to be

collected from a large number of respondents who were themselves geographically dispersed.

Contact details were collected from the university websites.

All items were measured using 7-point Likert scales in which 1= 'strongly disagree' and 7 =

'strongly agree', with the exception of the initial section on types of knowledge. In this case a

5 point scale was used and possible response categories were 'never', 'seldom', 'sometimes',

'often' and 'always'. Negative questions were inserted in order to temper the tendency of

respondents to give positive answers to questions irrespective of content (Messick, 1967).

The questionnaire was also piloted with a group of lecturers, as suggested by Czaja and Blair

(2005) in order to check that it was understood as intended.

Participants

Email requests containing a link to an online questionnaire (using Survey Monkey software)

were sent to a convenience sample of academics in different universities and disciplines.

Convenience sampling is based on the accessibility and availability of respondents and as

such, it is difficult to generalise findings to the entire population. However, this method is

widely used in business research because of the costs and difficulties generated by probability

sampling (Bryman and Bell, 2015).

The sample profile is shown in Table 2. The percentages of responses from each discipline

can be seen to be broadly equal. However, there were approximately twice as many responses

from pre-92 universities compared with post-92 universities. Gender distribution showed an

acceptable balance; just over 60% of the survey population were men and just under 40%

women. Nearly 40% of the sample has worked in their respective departments for less than 5

years and this figure decreases progressively to a proportion of 5.2% who have worked in

their department for over 26 years. Senior Lecturers and Lecturers (71.9%) made up by far

the most substantial group with regard to departmental position, whilst a further 17% were

classified as Professors. Researchers consisted of just over 5% of the sample although clearly

respondents in other categories would perform research as part of their role.

Insert Table 1 here

Procedure

The universities were selected on a purposive basis for questionnaire distribution in order to

include a number of post-92 (teaching-led) and pre-92 (research-led) universities.

Departments were selected on the same basis in order to provide a good representation of

subject disciplines within the broad groups of Arts and Humanities, Science and Technology

and Social Sciences. Questionnaires were distributed in waves over a period of 6 months and

reminders were sent to those who had not completed the questionnaire within 2 weeks.

Data Analysis

Structural Equation Modelling (SEM) was used to analyse the relationships within the

research model shown in Figure 1. SEM is second generation multivariate technique that uses

a hypothesis testing (confirmatory) approach to structural theory analysis. It uses a series of

regression equations but the advantage over other methods of regression is that relationships

between variables can be modelled graphically and measured using the Amos Software

program that is utilised in this research (Byrne, 2001). This research takes a two-stage

approach to SEM as suggested by Hair et al. (1995). The measurement model is initially

developed using the SPSS questionnaire data. CFA is then used to find out how reliable the

observed variables are and relationships between variables are then assessed (Schreiber et al.

2006).

Measurement model fit was established by CFA and a structural model was constructed in

order to test the relationships mapped in the research model. Model fit was again rigorously

tested before the results of the hypotheses testing were generated. Final measurement model

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indices were CMIN/DF=1.907, RMSEA=.50, CFI=.919 and NNFI=.901 which indicated a

good fit (Hair et al., 2006; Hu and Bentler, 1999). These are summarised below in Table 2.

The Affiliation to Discipline factor was removed from the model at this stage because of

model fit issues and is therefore not shown in the structural model.

Insert Table 2 here.

Table 3 shows the results of Confirmatory Factor Analysis. There are no convergent and

discriminant validity issues. Reliability is measured by composite reliability (CR) and these

are now all above the recommended threshold of .70 apart from Motivation which is

marginally below at .686.

Insert Table 3 here.

Structural Model Estimation

Fit indices for the structural model are CMIN/DF=2.291, RMSEA=.60, NNFI=.860 and

CFI=.871 which indicates a moderate fit (Hair et al., 2006; Hu and Bentler, 1999). Model fit

results are summarised in Table 4.

Insert Table 4 here

Hypothesised relationships within the model are presented in Table 5 and assessed for

statistical significance by considering the critical ratio (CR) which is calculated by dividing

the estimate by the standard error. A value in excess +1.96 (or lower than -1.96) demonstrates

two sided significance at 5% (Hox and Bechger, 1998). Hence, all hypothesised relationships

are supported but variations in standardised loadings highlight significant differences in the

strength of relationships. The final structural model which depicts the standardised

coefficients is shown in Figure 2 below the table containing the results of the hypotheses

testing. All relationships were found to be statistically significant.
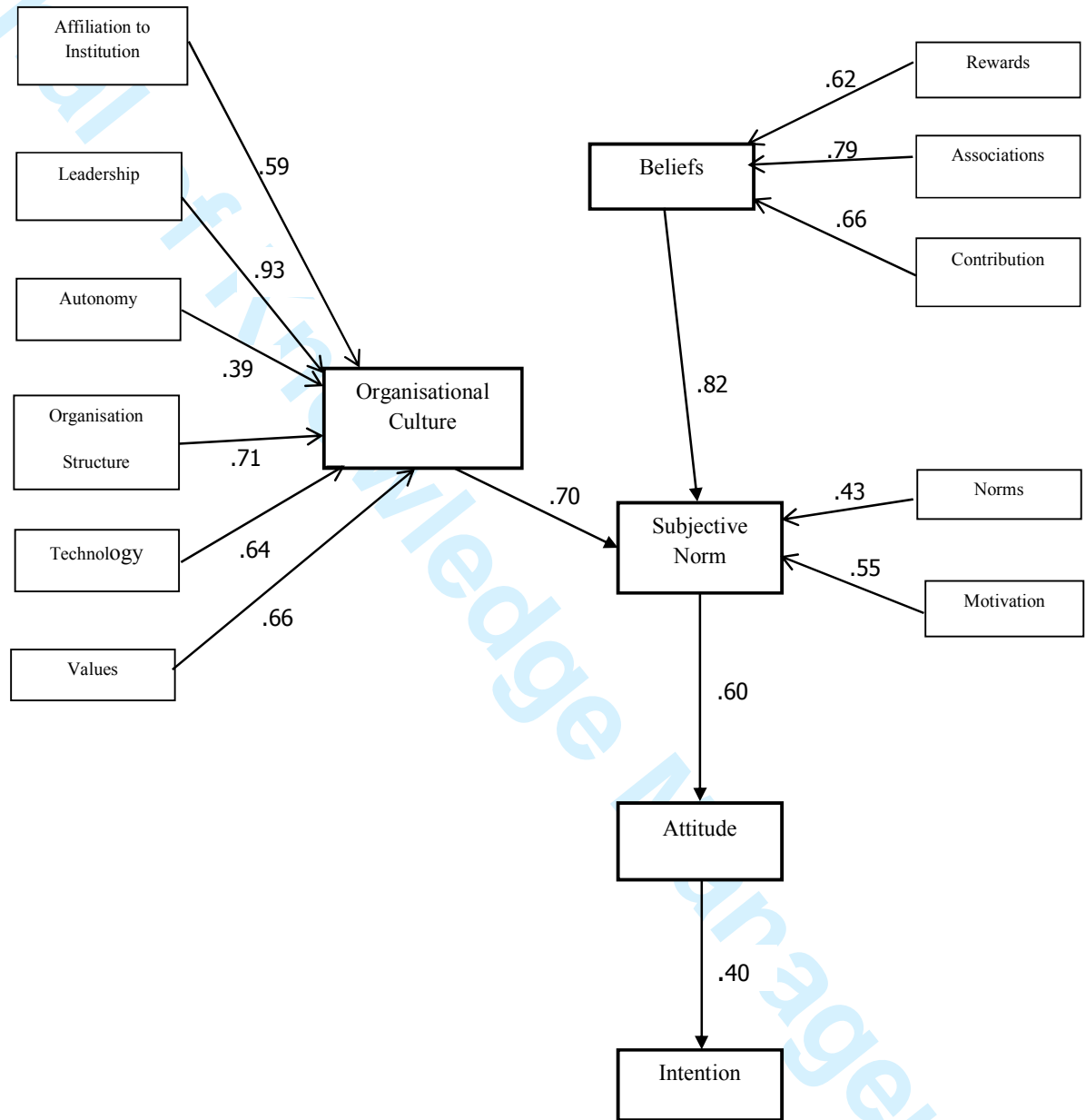
Insert Table 5 here

Figure 2. Structural Mode

In the structural model above (figure 2) affiliation to institution, leadership, organisational structure, autonomy, technology and values all have an effect on the overall organisational culture thus the model depicts these latent variables as components of the culture. The organisational culture in turn affects the attitude and intention to share knowledge after first being subject to the effect of the subjective norm. Affiliation to discipline was originally include but deleted due to significant model fit issues. Rewards, associations and contribution are similarly arranged in the model as components of beliefs also affects attitude and intention to share knowledge.

Finding and discussion

Organisational factors

The link between organisational culture and knowledge sharing has been well documented (McDermott and O'Dell, 2001; Connelly and Kelloway, 2003). The rationale for the enhanced importance of organisational culture was established by research by De Long and Fahey (2000) which discovered that new technology infrastructure for knowledge sharing needed to be accompanied by a fundamental change in organisational values and practices. Hislop (2013) also highlighted the critical role organisational culture occupies in knowledge sharing, which now overshadows the intellectual property and technological concerns that dominated earlier knowledge management literature.

In this research the link between organisational culture and subjective norm (H1) was found to be statistically significant and a moderately strong positive relationship was demonstrated (0.70). Thus knowledge sharing in academic departments did not appear to be significantly affected by the existence of sub-cultures and tensions between institutional and disciplinary culture (Lee, 2007).

A much less pronounced relationship (0.59) between affiliation to institution and

organisational culture (H2) was perhaps not surprising given the affiliation to discipline and

existence of associated sub-cultures referred to by Lee (2007).

Supportive leadership demonstrated a strong positive relationship with organisational culture

(H3) and a standardised coefficient of 0.93 indicated that leadership had a stronger

relationship with organisational culture than any of the other components of organisational

culture. Top management support for knowledge sharing was found to be crucial in

influencing the level of sharing amongst other employees by Lee et al. (2006). However, in

view of the multiple perceptions and identities associated with academic leadership it would

be valuable to explore further the effect of different leadership styles on knowledge sharing.

The relationship between autonomy and organisational culture (H4) was the weakest in the

organisational factors. This is indicated by a standardised coefficient of 0.39.This is not

surprising given traditionally high levels of autonomy within academia, which can indicate

that academics are operating without being influenced greatly by the overall culture.

Academic autonomy itself has been well documented and academics also expect their

autonomy to be protected by their by their leader (Lumby, 2012; Bolden et al., 2012).

Organisational structure exhibited a fairly strong relationship with organisational culture (H5)

as indicated by a standardised coefficient of 0.71. The move away from bureaucratic forms to

more decentralised forms of structure is widely credited with engendering an organisational

structure that is more supportive of knowledge sharing (Peters, 1992; Handy, 1993).

Although in academia, as Tippins (2003) pointed out, universities have rigid departmental

boundaries that can still inhibit the sharing of knowledge more widely and indeed throughout

universities (Newman and Turner, 1996). However, departmental structure usually exhibit

matrix structures often featuring subject groups which are widely credited with improving

knowledge sharing (Cummings, 2004).

Technology was found to have a positive effect on organisational culture (H6). However the

strength of the relationship was relatively low (0.63) compared with other components of

culture. This may be considered somewhat surprising given the access that academics have to

information technology. Virtual communication has indeed become much easier and

convenient, but. Hislop (2013) suggested that email is mainly suitable for highly codified

knowledge and Mayer et al. (1995) commented on the difficulties associated with developing

trust through email communication.

A moderate relationship between values and organisational culture (H7) was

demonstrated by a standardised path coefficient of 0.66. Given the individualist nature

of academic work and the high level of autonomy (Lee, 2007) a strong relationship

would seem unlikely, however values could be critical in terms of sharing academic

knowledge as these determine perspectives of ownership (Jarvenpaa and Staples, 2005)

Individual factors

Personal beliefs are crucial in the knowledge sharing decision because sharers can make a

calculation with regard to the possibility of rewards as well as possible costs (Blau, 1964).

Indeed, personal beliefs were a greater influence on the subjective norm than organisational

culture (0.82). Bock et al. (2005) considered that personal beliefs could consist of a belief in

extrinsic rewards for sharing such as an increase in salary or a promotion as well as intrinsic

rewards such as enhanced associations with other academics by for example attendance at
conferences.

**Associations (H9) had the strongest effect on beliefs (0.79) which appears to confirm
Lin's (2007) conclusion that a belief in intrinsic benefits encourages knowledge sharing
behaviour and Bock's (2005) findings which indicated a positive association between
knowledge sharing and reciprocal relationships.**

**Rewards (H8) had a fairly weak influence on beliefs in terms of knowledge sharing
(0.62. This concurs to some extent with multiple findings that indicate extrinsic rewards
have little effect on knowledge sharing behaviour (Bock and Kim, 2002; Bock, et al.,
2005; Lin, 2007). In contrast, Cheng et al. (2009) found that both rewards and
associations encouraged knowledge sharing behaviour. Contributions (H10) had a
stronger relationship with knowledge sharing behaviour (0.66) although this was not as
notable as the one demonstrated by associations. Thus it appears that participants had a
reasonable expectation that their knowledge sharing would lead to enhanced
organisational performance and increased confidence in ability to share knowledge that
is important to the organisation.**

Finally there was a fairly strong link between sharing in the subjective norm and attitude to
sharing (H13, 0.60) but this was much less pronounced in the relationship between attitude
and intention (H14, 0.40) although both were statistically significant.

Overall, statistical support for all the hypotheses suggests that academics are disposed to

share knowledge but the organisational culture has less influence on this process than

personal beliefs.

Conclusions and recommendations

One objective of this research was to develop a new measurement model that is appropriate

to the context of universities and this has been achieved by an adaptation of Bock's model

(2005). Similarly, organisational and individual factors that affect knowledge sharing in such

a context have been identified through the literature, a research model has been constructed

and the impact of such factors on sharing has been measured by the use of Structural

Equation Modelling. As in other studies in private and public organisations, culture was

found to be a significant influence on knowledge sharing, but in this particular study,

individual beliefs were shown to have a stronger relationship with knowledge sharing. This is

in keeping with the high level of autonomy afforded to academics.

It is clear from the research that there is scope to increase knowledge sharing in an academic

setting. Promotion of a knowledge sharing culture could encourage interdepartmental

research collaborations. Moreover, sharing best practices in teaching would enhance the

quality of teaching and programme design. Such sharing could certainly support

implementation of the government's planned Teaching Excellence Framework. Compliance

will be imperative to universities in the future given the intended link between higher

education funding and teaching quality (Department for Business Innovation and Skills,

2016). Greater sharing of knowledge by academics would also help facilitate a more

substantial engagement with both business in general and Innovate UK with the new

Research Council as proposed in the government's recent review (Nurse, 2015). The report

also suggested that barriers to ideas and skills between sectors and disciplines should be

much more permeable and increased sharing of knowledge would also enhance this process.

The connection between knowledge sharing by academics and the possibility of intrinsic

rewards suggests that incentives other than monetary to share knowledge should be the focus

of consideration. This could involve a more formal approach to the allocation of valued

rewards through the performance management system to promote research collaborations and

partnership working with external organisations, for example. However, this process could be

affected by the nature of the professional culture which could be oriented more towards

discipline or institution. Furthermore, academic autonomy may be the highly incompatible

with the   use of formal incentives.

Managers could also consider the impact of organisational structure on knowledge sharing

and its relationship with autonomy. Furthermore, there is a particularly strong relationship

between leadership and organisational culture. This should certainly indicate an examination

of the way in which academic departments are led, given the existing sharp contrast between

academic and managerial styles and the impact of different styles on the highly prized

autonomy of academics. The relatively weak link between technology and sharing could

prompt institutions to examine whether their system really does facilitate sharing.

Furthermore, associations formed with other academics, at conferences for example, could

certainly lead to greater knowledge sharing but also prompt even more focus on discipline

possibly at the expense of a focus on the institution. However, a process could be actioned

where such knowledge could in any case be shared. This could take place in a variety of ways

such as at departmental briefings, research seminars and social media activities. Research by

Cheng et al. (2009) highlighted on a codification approach where academics receive

incentives for uploading their research output to the university intranet on an annual basis and future research could focus on similar approaches.

The research is limited by its focus on individual university departments as units of analysis and the emphasis on knowledge sharing between academics and their colleagues. **Furthermore, 72% of respondents were senior lecturers and lecturers drawn from a diverse sample of universities. Thus it is unclear if all academics on these grades have the same obligation to publish and this could have ramifications for their knowledge sharing behaviour.**

Future research could also examine sharing by academics in a broader context that encompasses other institutions and businesses. Furthermore, because of the rapid growth in recent years of global research collaborations when compared to domestic collaborations (Adams and Gurney, 2016), future research could focus on the efficacy of computer mediated knowledge communication between researchers. Lastly, the generalisability of the study is also limited by its location in the UK context. However Marginson (2006) suggests that there are many similarities between UK, US, Australian and Western European universities in terms of culture, systems and research excellence.

Additional further research could usefully focus on:

- A more detailed examination of findings focussing on different disciplines and types of universities.
- The perspectives of academic leaders and support staff on sharing knowledge
- Academic culture and leadership models and their effect on sharing knowledge.
- Factors influencing sharing knowledge between academics and other organisations.

- The role of intrinsic and extrinsic rewards in knowledge sharing amongst academics and other university staff.

- The differences between externally and internally focussed knowledge sharing.

- Possible differences in the attitudes to knowledge sharing of researchers and lecturers and the effects of short-term contracts.

- Whether knowledge from staff intending to retire is being effectively captured.

- The link between intention to share and knowledge sharing behaviour.

- The extent to which knowledge sharing by academics promotes research and teaching collaborations with international partner institutions.

- The role of technology in academia in facilitating knowledge sharing.

Individual qualitative case studies of different types of universities may provide a more in-depth approach to investigating embedded concepts such as leadership and structure. Consequent benefits of such research could be a greater understanding of for example the role of, leadership, structure organisational culture and rewards in promoting knowledge sharing amongst different groups of staff. Furthermore, it could provide an insight into how knowledge shared between staff is being used, and whether this can result in added value. This could be in the form of research and teaching quality, links to external organisations and leveraging of teaching into distance learning and overseas provision. In particular, collaborations between researchers sharing their knowledge on the basis of affiliation to discipline could lead to more substantial research bids and thus lead to greater income generation.

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Table 1 Demographic Profile of respondents

Demographic Characteristics	Number of responses	Percentage
Disciplines		
Arts and Humanities	101	31.9
Science and Technology	104	32.8
Social Sciences	112	35.3
Classification of Institution		
Pre- 92	215	63.6
Post- 92	123	36.4
Gender		
Male	219	60.5
Female	143	39.5
Number of years in current department		
0-5	130	37.9
6-10	87	25.4
11-15	46	13.4
16-20	41	12.0
21-25	21	6.1
Above 26	18	5.2
Number of years in higher education		
0-5	60	17.5
6-10	73	21.3
11-15	68	19.8
16-20	63	18.4
21-25	30	8.7
Above 26	49	14.3
Position in department		
Professor	60	17.0
Senior Lecturer, Lecturer	256	71.9
Associate or Part-time Lecturer	20	5.7

| Researcher | 19 | 5.4 |

Table 2 Final measurement model fit indices

Fit Index	Recommended Criteria	Authors	Results
CMIN/DF (x^2)	≤5	Hair et al. (2006)	1.907
RMSEA	≤.10	Byrne (2001)	.050
IFI	≥.80	Hu and Bentler (1999)	.921
NNFI (TLI)	≥.90	Hair et al. (1998)	.901
AGFI	≥.80	Hair et al. (1998)	.836
CFI	≥.80	Hu and Bentler (1999)	.919

Table 3 Results of confirmatory factor analysis

Measures	Items	Composite Reliability	Average Variance Extracted
Autonomy	2	.850	.740
Affiliation to Institution	4	.808	.587
Leadership	3	.841	.517
Values	3	.812	.535
Contribution	3	.765	.521
Technology	3	.749	.499
Structure	2	.768	.624
Intention	2	.700	.548
Attitude	3	.791	.562
Norms	3	.816	.597

Table 4 Final structural model fit indices

Fit Index	Recommended Criteria	Authors	Results
CMIN/DF (x^2)	≤5	Hair et al. (2006)	2.291
RMSEA	≤.10	Byrne (2001)	.060
IFI	≥.80	Hu and Bentler (1999)	.872
NNFI (TLI)	≥.90	Hair et al. (1998)	.860
AGFI	≥.80	Hair et al. (1998)	.803

Table 5 Results of hypotheses testing

Hypotheses	Standardised Coefficients	CR	p	Result
H1 Organisational Culture ===> Subjective Norm	.70	5.008	***	Supported
H2 Affiliation to Institution ===> Organisational Culture	.93	7.319	***	Supported
H3 Leadership ===> Organisational Culture	.71	7.552	***	Supported
H4 Autonomy ===> Organisational Culture	.59	6.871	***	Supported
H5 Organisational Structure ===> Organisational Culture	.66	7.653	***	Supported
H6 Technology ===> Organisational Culture	.39	4.987	***	Supported
H7 Values ===> Organisational Culture	.64	6.871	***	Supported
H8 Rewards ===> Beliefs	.62	6.475	***	Supported
H9 Associations ===> Beliefs	.79	7.381	***	Supported
H10 Contribution===> Beliefs	.66	7.381	***	Supported
H11 Beliefs ===> Subjective Norm	.82	5.092	***	Supported
H12 Subjective Norm ===> Attitude	.60	5.475	***	Supported
H13 Attitude ===> Intention	.40	4.127	***	Supported