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# Factors Affecting IT Adoption within Indonesian SMEs: Manager's Perspectives

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## Abstract

*This paper presents some findings from an ongoing doctoral research project investigating the adoption of Information Technology (IT) within Indonesian small and medium enterprises (SMEs). The aim of this research is to compare the actual factors influencing Indonesian SME managers in IT adoption decisions with those factors suggested in the literature, which is drawn mainly from research in developed countries. An initial model of factors affecting managers' decisions regarding the adoption of IT was developed from the literature. This model includes external and internal factors and was used to develop semi-structured interviews with 35 managers of Indonesian SMEs in the area of furniture and handicraft. Factors influencing Indonesian SME managers in IT adoption decisions were extracted from the interviews and compared to the literature.*

**Keywords:** Keyword Indonesian SMEs, IT Adoption, Manager, Factors

## 1. Introduction.

Small and Medium Enterprises (SMEs) form a significant proportion of the economy in many countries (Drew 2003; Ihlstrom et al. 2003). Managing SMEs is not, however, the same as managing larger companies since SMEs have fewer resources available and fewer personnel to manage the business (Fink 1998; Thong 2001). Accordingly, managing the information technology (IT) function in SMEs, including the adoption of IT, may be different from managing in large enterprises.

There is considerable literature explaining IT adoption within organisations, a portion of which is aimed at SMEs (for example Dutta and Evrard 1999; Ihlstrom et al. 2003; Scupola 2002; Walczuch et al. 2000). However, most of the literature is based on research conducted in developed countries, and so might not be able to explain completely the phenomenon of IT adoption in less developed countries such as Indonesia. Elliot (1996), Bagchi, et.al. (2004), and Gefen, et.al. (2005) argue that culture might influence the adoption of IT in different ways for developed and less developed countries.

This paper is a report of initial findings from an ongoing doctoral research project conducted by the first author. The research is investigating the adoption of IT by Indonesian SMEs. The aim of this paper is to compare the actual factors influencing managers of Indonesian SMEs in IT adoption decisions with the literature which is drawn mainly from research in developed countries, and to assess whether any differences found might be due to cultural influences.

In the next section, the theoretical background of IT adoption within SMEs is discussed. We then introduce our research method followed by a summary of the initial results. These

are discussed and compared with the literature. In conclusion we highlight some factors where our findings differ from other studies.

## 2. Factors Affecting IT Adoption within SMEs

Rogers (1995) defines adoption as the decision to make full use of an innovation as the best alternative. IT adoption can be defined as the decision to use IT to support operations, management, and decision making in the business. (Fink 1998; Rogers 1995; Thong and Yap 1996).

The definition of SME itself varies among organisations and countries. As one alternative for a world wide definition, the World Bank use the following criteria for SMEs (IFG, 2002):

- a) Small enterprise-up to 50 employees, total assets of up to \$3 million and total sales of up to \$3 million
- b) Medium enterprise-up to 300 employees, total assets of up to \$15 million, and total annual sales of up to \$15 million.

In Malaysia, the Small and Medium Industries Development Corporation (SMIDEC) uses a combination of number of employees, invested capital, total assets, sales turnover, production capacity, and average income (SMIDEC 1998). In Indonesia, an SME is defined as any business organisation which possesses assets less than US\$ 1 Million (excluding land and building) and has annual sales turnover less than US\$ 5 Million (SMIDEC 1998). The organizations studied in our research would fit into any of the above definitions of SME.

The existing literature has documented some of factors that affect IT adoption by SMEs in developed countries (Chau 1995; Cragg and King 1993; Drew 2003; Dutta and Evrard 1999; Fink 1998; Ihlstrom et al. 2003; Thong and Yap 1996; Walczuch et al. 2000). Meanwhile Al-Gahtani (2003), Khalfdan et.al. (2004), and Tarafdar, et.al. (2005) focused on IT adoption in less developed countries but not specifically aimed at SMEs. So far only and Utomo and Dodgson (2001) focused on SMEs in less developed country, which is Indonesia.

The above studies identified factors that are divided into those internal to the SME and those external to the SME. These factors and the research that identified them are shown in table 1 and summarised in figure 1. These factors are mostly derived from research in developed countries, except for Thong and Yap (Singapore), and Utomo and Dodgson (Indonesia).

Internal		External	
Factors	References	Factors	References
<b>Manager</b> Perception toward IT such as benefit, cost, & risks # IT experience IT knowledge Perceived alignment with business strategy	(Cragg and King 1993; Fink 1998; Ihlstrom et al. 2003; Thong and Yap 1996; Utomo and Dodgson 2001)	<b>Government</b> Public infrastructure availability Regulation # Subsidies # Training #	(Dutta and Evrard 1999; Utomo and Dodgson 2001)
<b>Resources</b> Financial resources availability Internal IT infrastructure availability Operational cost	(Drew 2003; Dutta and Evrard 1999; Fink 1998; Ihlstrom et al. 2003; Thong 2001)	<b>Customers</b> Initiatives or pressure for IT adoption	(Drew 2003; Fink 1998)
<b>Staff</b> Staff readiness IT experience Staff acceptance for IT adoption	(Chau 1995; Drew 2003; Fink 1998; Mirchandani and	<b>Competitors</b> Competitive pressure #	(Cragg and King 1993; Drew 2003; Fink 1998)

Table 1. Factors affecting SME manager's decision for IT adoption (from literature)

# Factors not mentioned by our participants (see Table 2, section 4)

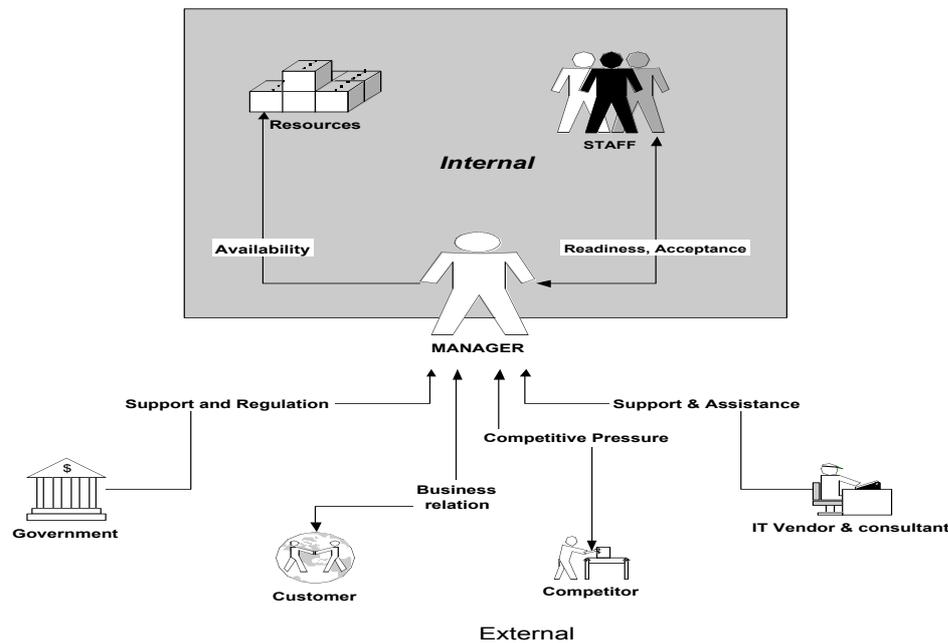


Figure 1. Factors influencing IT adoption decision making in SMEs (from literature)

In our research this table of factors was used as a guide when producing the questions for semi-structured interviews of managers of Indonesian SMEs. The relatively detailed questions allowed the interviewer to direct attention to these factors, while the open ended answers allowed interviewees to follow up these factors, dismiss them as insignificant, or suggest additional factors.

### 3. Research Method.

The above model illustrating factors influencing the SMEs' manager in IT adoption decision making was used to develop a semi-structured interview. Semi-structured interviews were selected to gain more in-depth and complete responses from participants, yet still provide a structure for further analysis (Creswell 2003; Leedy and Ormrod 2001; Williamson 2002). Semi-structured interviews also enable the interviewer to clarify participants' responses and explore a wider range of issues than might emerge otherwise.

The questionnaire was developed to guide data collection on the experience of the Indonesian SME managers during their IT adoption process, especially the factors that influenced them. The questions were asked to find out who were involved in the IT adoption process internally, the manager's perception toward IT, factors considered when the decision was made, and external parties involved. The questionnaire was originally developed in English and then translated into Indonesian by the first author who is native Indonesian speaker. The Indonesian language questionnaire version was tested on a few Indonesian students in Australia.

Once the final version of the semi-structured interview was ready, the field study was conducted by the first author between the months of December 2003 and February 2004. The participants were selected from a list of Indonesian SMEs in the furniture and handicraft industry and situated in Yogyakarta and Surakarta region in Central Java; the list was compiled from data provided by Indonesian Yellow Pages and Indonesian SMEs council and

association. The furniture and handicrafts industries were chosen because they are significant local industry in which one of the authors had experience as IT consultant. As a manufacturing industry in an area of low labour cost, they are not obviously information intensive, but as most of their customers are international they need IT based communications. They also use IT in their internal business operations, but usually do not have a dedicated IT department.

All the participants already used basic computer applications for their business, such as office applications (for administrative functions, reporting, and book keeping), internet applications (for simple business intelligence, email, simple marketing and order tracking), and graphic manipulation applications for product design. Two of the companies had computerised inventory systems. The chosen (adjacent) regions of Central Java are considered as one the main centres of furniture and handicrafts in Indonesia; as all the SMEs are from the same region they face similar business environments (transportation, raw materials sources, export market, etc.).

From the list of more than 300 companies, 42 were unable to be contacted by any means. It is possible that the companies have already out of business or simply relocated without leaving contact details. Fourteen companies refused to be interviewed because either they did not use IT or the have stopped using IT. Further persuasion still did not change their mind. Thirty six companies accepted the invitations to participate and the rest of the companies on the list refused to participate with various reasons. In the end, only 35 companies can be included since the 36<sup>th</sup> companies were not fit into Indonesian SMEs definition. We decided to interview the 35 participants who have already had and used IT to find out what influences they were aware of.

The first author conducted all the interviews at the participants' premises or other places of their choice to enable participants to feel comfortable with the surroundings and therefore more relaxed during the interview. All the interviewees were the manager; 17 participants were also the owner of the SME, while the rest reported directly to the owner. The managers were selected because in SMEs almost all decisions are made by the manager and they are often directly involved in the IT design and implementation (Fink 1998; Thong and Yap 1996). We also found that in 18 SMEs with a dedicated manager (non-owner), the owner was heavily involved in decision making (including IT investment decision making).

All the interviews were recorded and transcribed by the first author. From the transcripts, a context analysis (Boyatzis 1998; Neuendorf 2002; Weber 1985) was conducted to extract the factors influencing the manager's decision for IT adoption. Phrases and sentences which were used similarly by several respondents were classified into one of the seven major categories and matched to factors from the literature (as shown in table 1) or added as new factors. From time to time the original recorded interviews were replayed and compared to transcripts to ensure the consistency of the data extracted. A text summary of participants' transcripts was made as a cross check on the factor mapping. From the factor table and participant's response summary, the factors that affecting the SME managers' decisions to adopt IT emerged. These findings are presented in the next section.

#### **4. Initial Findings**

Thirty five participants used various IT, ranging from office application to web catalogue. The participants' organisation has two main group of employee, the permanent administration staff (ranging from 1 to 50) and casual production staff (up to 700 at a time). The casual production staff were fluctuating as the order quantity change.

The factors extracted from the 35 interview transcripts were grouped into a table based on categories in the model drawn from literature above (table 2). Participants' response to the questions regarding the reason for IT adoption and factors they were considered for adoption were grouped and placed under the same heading as table 1.

<b>Internal</b>	<b>External</b>
<p><b>Manager</b>            Attitude toward IT:</p> <ul style="list-style-type: none"> <li>• Areas of IT usage</li> <li>• Future IT plan</li> <li>• Initiatives for IT adoption</li> <li>• Perceived impact of IT adoption</li> </ul> <p>IT experience and knowledge were not a problem            Decision making style for IT adoption</p> <p><b>Resources</b>            resources not a limiting factor</p> <p><b>Staff</b>            Initiatives for IT adoption *            Staff readiness            IT experience            Learning style *</p>	<p><b>Government</b>            Public infrastructure availability</p> <p><b>Customers</b>            Initiatives or pressure for IT adoption</p> <p><b>Competitors</b>            Trend in IT adoption *</p> <p><b>IT Vendors &amp; Consultant</b>            IT solutions availability *            External consultant support            IT vendor support            Initiatives for IT adoption *</p>

Table 2. Factors affecting adoption decision (extracted from interview transcripts)

\* Factors not mentioned in table 1.

## 5. Discussion.

### 5.1. Manager

The study found differences between participants' responses and what the literature suggested as factors in management perception toward IT. In the literature management's perceptions, as they related to IT adoption, focussed on perceived benefit, perceived cost, and risk (Cragg and King 1993; Fink 1998; Ihlstrom et al. 2003; Thong and Yap 1996). The perceptions of our participants were mostly oriented toward future uses of IT rather than cost and risks. This attitude toward IT may come from their previous education or from information on the benefit of IT obtained from external sources (Chau 1995; Ihlstrom et al. 2003). They could see the areas where IT could help their business. They may have had a low perception of risk because they themselves often initiated the IT adoption, had a realistic expectation of the result, were personally involved in the project, and conceived future plans to adopt more IT innovations.

*Before I built this company, I thought of what we needed in terms of facilities; a computer was one of them (participant 9)*

*We intend to develop a bar coding system for our inventory next year (participant 1).*

All the decisions within participants' organisation were made solely by the manager with minimum or no input from the staff. This might be due to the centralistic style of management common in Asian countries (Elliot 1996) as well as being a common feature of SMEs (Rule and Attewell, 1989). This decision making style did not influence the manager in making IT adoption decisions but it might make the IT adoption easier, since all the decisions were made and enforced to the staff by the manager.

## 5.2. Resources

Within the participants' internal organisation, resources were not a problem. The participants were able to finance their IT adoption by allocating some of their capital, payment by instalments facility from the IT vendors, or donation from the participant's family members. This fact is somewhat different from the literature, where it is stated that SMEs would find lack of financial resources as one of the barriers to IT adoption (Chau 1995; Fink 1998; Ihlstrom et al. 2003). This difference is probably due to the fact that the prices of basic IT hardware in Indonesia are relatively inexpensive (there is also anecdotal evidence that software piracy is a big problem in Indonesia leading to availability of cheaper illegal software). In any case, hardware prices worldwide are lower than they would have been in some of the earlier studies. Other resources were also not a problem since the participants could acquire them if necessary.

*When we need computers we only need to make a proposal to the owner (participant 7)*

*We allocated some of our capital to purchase computers (participant 9).*

## 5.3. Staff

Within staff category, staff acceptance of IT adoption was also not the problem suggested by the literature (Fink 1998; Ihlstrom et al. 2003). Once the manager decided, the staff would usually comply or they would be moved to other sections which were not affected by the newly adopted IT. In other words, the manager imposed the adoption and assumed that the staff would support it unreservedly.

*The sales force just accepted it (participant 3)*

*If they don't like it, that is alright. I will assign them to other job that is not using computers (participant 4).*

Some participants even recalled that their staff were the ones who proposed the use of computers to solve their problems. This eventually led to the acceptance of the IT adoption.

*One of my staff, who communicates with our overseas client frequently, asked me to buy computers and subscribe to the Internet (participant 15)*

*We have computers, I think, in two of the departments and the rest of the staff indicated that they would probably work more effectively using computers, so actually it came from them as well (participant 1).*

Most of the participants' staff who operate computers were university graduates or required to be university graduates. As a result, computer literacy is not a major issue as suggested in the literature (Ihlstrom et al. 2003; Walczuch et al. 2000). After all, they only operate basic computer applications. This fact led to a self study learning style, where the staff would learn by themselves how to use the computer applications.

#### **5.4. Government**

The participants' only concern with the government was the lack of public infrastructure availability and quality. The public infrastructures of concern were telecommunications, especially access to the internet. Utomo and Dodgson (2001) suggested that this problem might have been solved by now, but the new government supported infrastructure project has not eventuated. In Europe, there appears to be more government support for IT infrastructure (Dutta & Evrard (1999).

*We have difficulties in accessing the internet. It is slow and expensive due to the poor telephone cable (participant 9).*

*There is no telephone/internet line here. We can't send our designs (participant 13).*

Mostly, the participants were not aware of any government regulations or subsidies that might have helped them in IT adoption. One the participants even believed, from the previous experience, that typical training and workshops provided by the government might not meet their requirements, since they were too general to be applicable. This confirms what Dutta & Evrard (1999) found in their study of European SMEs.

*I am not aware of any computer training from the government (participant 14).*

*The previous training is too much theory and inapplicable (participant 10).*

#### **5.5. Customers**

There are no differences between the findings from our field study and the literature with respect to customers. The findings confirm that the customers can initiate IT adoption by applying pressure to the participants (Drew 2003; Fink 1998). The major customers for all the participants were overseas customers who made up more than 90% of their annual sales and most of these customers prefer to do business by email.

#### **5.6. Competitors**

The competitors apparently had insignificant influence on the participants' IT adoption decision. Only one participant mentioned that he observed the trend of building websites for promotional purposes by other SMEs, yet he did not want to follow since his company's production capability might not be able to meet the increase in orders. Another participant said that he had evaluated a proposal for a company website, but had not adopted it and would not reconsider it in foreseeable future. This is in contrast to the literature's suggestion that competitive pressure could force the SMEs to adopt IT (Cragg and King 1993; Drew 2003; Fink 1998).

#### **5.7. IT Vendors and Consultants**

The IT vendors and consultants were perceived as necessary by the participants not only for their support but also as source of information on the availability of IT solutions that fitted their need, as suggested by the literature (Cragg and King 1993; Fink 1998). The participants believed that the IT vendors' and consultants' support would be critical during the deployment of the IT solutions due to the lack of technical knowledge within the participants' organisation. However, our study found that IT vendors and consultants also often gave the idea to the participants to adopt IT as a result of marketing efforts.

## 6. Conclusions and Future Works

From the comparison between results of the field study and literature, it was found that there were some similarities and some differences. The Indonesian managers agreed on the importance of public infrastructure availability, that pressure for adoption often came from customers, that external consultant and vendor support was important, and that success relied on staff readiness and IT experience (although in Indonesia this was almost always present).

The most apparent differences among the external factors concerned the government and competitors. The participants' only concern with the Indonesian Government was the lack of public infrastructure provided; there was little hope of government subsidies or training, and government regulations had no impact. While the pressure of competition seemed irrelevant to the IT adoption decision, managers did observe trends in IT use among their competitors. Among the internal factors internal resources, especially financial resources, were not a problem. This is different from what the literature suggested earlier (Fink 1998; Ihlstrom et al. 2003). Probably with the price of IT products becoming cheaper the acquisition of IT products was not a financial burden anymore. As for staff acceptance, it was found that this was almost guaranteed, probably due to the centralistic management style (Elliot 1996). Staff readiness again was not a problem since most staff were university graduates and had experience in using basic IT applications. Managers' general attitudes towards IT were not a factor in our study, since all were quite positive towards IT. In reality, their perceptions were more focussed on the benefits they could foresee from particular IT applications. The centralistic management style also proved favourable in IT adoption. There was no rejection from the staff once the manager decided, since they would be assigned to other functions if rejected the IT adoption.

As noted, these conclusions differ somewhat from previous studies, including that of Utomo and Dodgson (2001) which was also conducted in Indonesia. It may be that our semi structured interviews gave more scope for open ended replies, and therefore allowed the participants to introduce factors different from those included in the mainly questionnaire based models in the literature.

As we continue this project we will undertake further analysis of the interviews and of possible reasons for differences between our results and those previously found. We had originally intended take guidelines for IT adoption in SMEs such as those proposed by Fink (1998) and adapt them for use in developing countries such as Indonesia based on the results of our research. However, as it appears that the Indonesian SMEs studied are at least as successful in their IT adoption as those SMEs referenced in the literature, it may be more appropriate to use the Indonesian experience to produce improved suggestions for use in developed countries. This question will be studied further.

In general, our knowledge of IT adoption might be further improved by more studies (in both developed and developing countries) based on interviews rather than surveys, as many surveys have a tendency to prejudge what factors might be important.

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