

A DELPHI OF EXPERT PERCEPTIONS OF PROBLEMS IN IMPLEMENTING ELECTRONIC COMMERCE FOR HORTICULTURAL PRODUCTS

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Abstract: The objective of the study was to identify the major problems facing Electronic Commerce (EC) implementation in horticultural products. To accomplish this objective the Delphi method of obtaining group consensus was employed. The study used a series of four mailed questionnaires. The first round of the study used a questionnaire with an open-ended question. In the second questionnaire, respondents were asked to rate the items identified in round one on a five-point Likert-type scale. In the third round, panel members were asked to indicate the importance of problems from round two, and to provide comments if they could not agree with the summary findings. The fourth and final round produced consensus on 46 of the problems from round three. The major problems identified by the Delphi method in the EC implementation in horticultural products were : E-government growth(E-banking, E-transactions, E-insurance, E-customs), telecommunication infrastructures, quantity and quality of advertising, perceived opportunities, managerial skills, political pressures on economy, economic stability, electronic banking infrastructures, unity of directing, entrepreneurship culture and resistance to change.

Key words: Delphi method; Electronic commerce; Horticultural products; Perception; Problem.

INTRODUCTION

Nowadays, Electronic Commerce (EC) is in the state of global expansion and has influenced all the industries. This phenomenon has been widened under the effect of extensive use of Internet. Today, the discussion on utilizing EC is one of the current and hot debates in the world of trade and commerce. Due to unlimited advantages of EC, interest of companies to employ this, is

being increased, day-by-day. EC is rapidly growing on all areas of industries among international community in a way that the growth rate of the field during the recent past years has been much higher than anticipated (Elahi and Hassanzadeh, 2006., Turban et al., 2006., Ntaliani et al., 2010).

Many developing countries have implemented a diverse range of strategies to develop EC in many areas. The value of

international EC in 2011 is estimated at 318, 000 billion \$ US. Meanwhile the figures in Iran are desperate so that the data show a value of 4, 10, and 100 million \$ US for years 2005, 2006 and 2007, respectively a very low share of the international market is taken by the country (Sanayei, 2008).

Although Iran has taken some measures in this regard, available statistics and documents do not show a satisfactory condition for EC in Iran, especially for horticultural products. The share of country in highly growing international EC is almost negligible and lack of official data in the country makes the situation even vaguer. The data shows that the country is facing a couple of problems and problems in developing EC (Dezhpasand and Rasouli Nezhad, 2009., Van Slyke et al., 2010).

Research on the EC implementation problems in agricultural sector is limited. Several researchers have identified problems including poor infrastructures in rural areas, lack of awareness(Sanayei, 2008), and weakness of transportation and postal system, cultural aspects of organization, top management weakness, low confidence to government, band width, socio-political, cognitive and economic problems(Vaidya and Tarafdar, 2007., Kshetri, 2007). Ranganathan and Teo(2004) indicated that lack of experts, undissolved security issues, lack of top management support and inadequate international accessibility as the most important problems.

While the studies have established factors predicting EC implementing in horticultural products, a void exists in the research base in identifying specific problems to EC implementing in horticultural products in Iran. It is clear that without identifying the problems facing implementation of EC in horticultural products, there is no chance for being successful in executing related planning.

For rational implementation of the EC, it was necessary to identify the most critical problems facing it in horticultural products according to analyzing materials and documents available in the country. Furthermore, successful identification

of these problems could provide policy makers and managers with improved insight into practical strategies for the development of EC in agricultural sector specifically horticultural products. Thus, the basic research question is: what are the major problems facing development of EC in horticultural products in Iran.

Purpose and Objective

The purpose of this study was to develop a consensus document that would identify those problems that serve as problems to the EC implementation in horticultural sector. The objective of the study was to identify the major problems facing development of EC in horticultural products by experts.

METHODOLOGY

This study used Delphi method to identify problems that horticultural products face in implementing EC. Dyer, Breja and ball(2003) described the Delphi method as a group process used to Solicit, collate and direct expert responses toward reaching consensus. The Delphi technique is a method of securing and refining group opinions and substituting computed consensus for and agreed-upon majority opinion. Stufflebeam, McCormick, Bin Kerhoff and Nelson(1985) noted the Delphi technique is specifically effective in obtaining consensus from a purposively selected group of experts.

Having identified 8 experts who's expertise was confirmed by the research committee, we communicated them to introduce more experts to develop the panel to a satisfactory level. They introduced 22 more members to be included in the study. Then we asked these 22 experts to name more experts, resulting in identifying 5 more experts. As one can conclude, we have applied snowball and judgment sampling technique to gather the data.

We applied Kendal coefficient to determine the consensus scale. Using the follow formula, the coefficient is used to determine the degree of agreement between a couple of priorities related to N people or things.

$$W = \frac{S}{\frac{k^2}{12} (N^3 - N)}$$

$$s = \sum \left[R_{J - \frac{\sum R_J}{N}} \right]$$

The population for this study consisted of managers, consultants, experts, faculty members, writers, researchers and economy practitioners regarding EC. In total, 11 out of 35 selected people were reluctant to participate; 3 were removed as they did not reply back. Finally,

the number of panelists reduced to 21. Dyer, Breja and ball(2003) stated that the reliability was greater than %80 when Delphi group size is larger than 13. The expertise of panelists is displayed in following table.

Table1: Delphi panel members

| Profession and activity area | n |
|---------------------------------------|---|
| Manager, consultant and expert | 5 |
| Faculty member of research institutes | 5 |
| Writer and researcher | 7 |
| Economic active practitioners | 4 |

The study used a series of four mailed questionnaires. Moore(1987) noted that a series of mailed questionnaires was the typical methodology of the Delphi technique. The first round of the study used a questionnaire with the open-ended question: what are the major problems confronting the EC implementing in horticultural products? An open-ended question was used to facilitate the generation of a wide array of response categories. Responses were categorized to produce items for a second round questionnaire. Questionnaires were validated using expert panel of university educators, administrators and policy makers in EC not included in the study. In the second questionnaire, respondents were asked to rate the items identified in round one on a five-point Likert-type scale (1-1.5= strongly unimportant, 1.51-2.5= unimportant, 2.51-3.5= uncertain, 3.51-4.5=important, 4.51-5= strongly important). From second-round responses the list of categories was further reduced to 49.

The third questionnaire sought to determine consensus. Panel members were asked to indicate the importance level of the problems, and to provide comments if they could not agree with the summary findings. Consensus was reached on 46 of 49 items in this round. A fourth round was initiated in an attempt to reach consensus on the remaining items. The fourth and final questionnaire also asked the respondents to indicate if problems are the same as the modified ones from round three. Consensus was reached on 46 of the problems in this round.

Analysis of Data

Data were analyzed using descriptive statistics. Data collected using Likert-type scales were treated as interval data and reported as means and

standard deviations. Nominal data were reported using frequencies and percentages.

RESULTS

This study sought to identify the major problems facing EC implementation in horticultural products. To accomplish this objective the Delphi method of obtaining panelist's consensus was employed. The first round of the study used a questionnaire with the open ended question: "what are the major problems confronting EC implementing?". Based on literature review, a primary list consisted of 48 cases of problems was identified. The primary list in an alphabetic order is:

Agricultural markets map, Awareness about Internet implications, Band width, Brands law, Competitive commercial economy, Comprehensive agricultural services information, Comprehensive national information network, Computer literacy among customers, Computer literacy among enterprises, Concordance between law making procedures and monitoring, Copy right observance, Country membership in WTO, Custom tariffs, Economic stability, E-government growth(E- banking. E-transactions, E- insurance, E- customs), Electronic signature, Experienced and accessible consultants, Facilitator and clear regulations, Government domination on economy, Importance of face to face relations in transactions, Initiative costs, Internet and PC penetration rate, IT skillful operators, Low confidence to accept the EC as a change, National willpower, Neglecting R&D, Perceived opportunities, Perceived Transactions risks, Corruption of horticultural products, Political pressures on economy, Political stability, Postal

system, Quantity and quality of advertising, Rate of participation and interaction among users, Resistance to change, Results visibility in short time, Skill and experience, Software support to IT and ICT, Standards for documentation, Tax Law, Telecommunication infrastructures, Transparency in policy and strategies, Transparency in rules and regulations, Unity of directing, Users English language literacy, Using traditional management patterns, Volume of horticultural products and Process of solving legal disagreements.

In round one, panelists chose 33 problems (out of a 48 impediment list) as “important and very

strongly” in applying EC in horticultural products. These problems were chosen out of those identified based on prior researches which were included in the questionnaire as close-ended choices. We also asked the panelists to name further problems according to their own experience. The result was identification of 39 more problems which were finally refined and decreased to 35 problems as mentioned by the respondents. The two groups of identified problems had 6 cases in common reducing the second group of problems to 29.

Table2: Delphi study round One: ordered problems based on the level of importance (n=21)

| | Problem | M | Std | Level of importance |
|----|--|------|------|---------------------|
| 1 | E-government growth(E-banking, E-transactions, E- insurance, E- customs) | 4.62 | 1.17 | strongly important |
| 2 | Telecommunication infrastructures | 4.53 | 0.99 | strongly important |
| 3 | Quantity and quality of advertising | 4.47 | 1.13 | strongly important |
| 4 | Perceived opportunities | 4.41 | 1.19 | strongly important |
| 5 | Political pressures on economy | 4.39 | 0.86 | strongly important |
| 6 | Economic stability | 4.37 | 1.06 | strongly important |
| 7 | Resistance to change | 4.37 | 0.96 | strongly important |
| 8 | Users English language literacy | 4.32 | 0.79 | strongly important |
| 9 | Unity of directing | 4.29 | 1.13 | strongly important |
| 10 | Transparency in policy and strategies | 4.27 | 0.84 | strongly important |
| 11 | IT skillful operators | 4.23 | 1.24 | strongly important |
| 12 | Using traditional management patterns | 4.20 | 1.19 | strongly important |
| 13 | Facilitator and clear regulations | 4.19 | 0.94 | important |
| 14 | Perceived Transactions risks | 4.17 | 1.26 | important |
| 15 | National willpower | 4.14 | 1.22 | important |
| 16 | Standards for documentation | 4.13 | 1.09 | important |
| 17 | process of solving legal disagreements | 4.11 | 0.98 | important |
| 18 | Experienced and accessible consultants | 4.08 | 1.03 | important |
| 19 | Confidence rate to accept the EC as a change | 4.07 | 1.13 | important |
| 20 | Comprehensive national information network | 4.03 | 1.32 | important |
| 21 | Competitive commercial economy | 4.03 | 1.07 | important |
| 22 | Government domination on economy | 3.99 | 0.91 | important |
| 23 | Country membership in WTO | 3.94 | 0.75 | important |
| 24 | Internet and PC penetration rate | 3.92 | 1.16 | important |
| 25 | Postal system | 3.90 | 1.27 | important |
| 26 | Comprehensive agricultural services information | 3.86 | 1.12 | important |
| 27 | Computer literacy among enterprises | 3.77 | 0.79 | important |
| 28 | Computer literacy among customers | 3.76 | 0.89 | important |
| 29 | Software support to IT and ICT | 3.62 | 1.36 | important |
| 30 | Band width | 3.62 | 0.87 | important |
| 31 | Neglecting R&D | 3.58 | 1.18 | important |
| 32 | Awareness about Internet implications | 3.56 | 1.13 | important |
| 33 | Agricultural markets map | 3.53 | 0.86 | important |

List of problems identified by panelists in round one, and number of respondents for each problem is showed in alphabetic order as follows:

Table3: problems identified by panelists in round One

| | problem | n |
|----|--|----|
| 1 | Commercial facilitating degree | 10 |
| 2 | Comprehensive agricultural products information site | 12 |
| 3 | Confidence to government | 4 |
| 4 | Cultural aspects of organization | 12 |
| 5 | Customer support law | 11 |
| 6 | EC impact on increasing the unemployment | 5 |
| 7 | Electronic Banking infrastructures | 15 |
| 8 | Entrepreneurship culture | 14 |
| 9 | Governmental investment in informatics systems | 14 |
| 10 | High touch quiddity for horticultural products | 3 |
| 11 | info mediators enthusiasm | 3 |
| 12 | International and regional organizations presence | 8 |
| 13 | Internet speed and costs | 12 |
| 14 | ISPs regulations clarity | 6 |
| 15 | Managerial skills | 12 |
| 16 | Multi currency payment system | 6 |
| 17 | National integrated systems | 8 |
| 18 | Perceived risk from new technologies by SMEs | 14 |
| 19 | Perceived risk in entrance to EC world | 11 |
| 20 | Preferring immediate benefits instead of late benefits | 11 |
| 21 | Private limits safeguarding | 9 |
| 22 | Private sector enthusiasm | 12 |
| 23 | Stealing risk for private information | 13 |
| 24 | Swindling via credit cards | 9 |
| 25 | To be exemption and special facilitates | 6 |
| 26 | To lose competitive preference | 8 |
| 27 | Top management support | 13 |
| 28 | Update and transparent information | 9 |
| 29 | Using public information for all | 8 |

Table4: Delphi study round Two: ranked problems based on the level of importance (n=20)

| | Problem | M | std | Level of importance |
|----|--|------|------|---------------------|
| 1 | Top management support | 4.69 | 1.23 | strongly important |
| 2 | Cultural aspects of organization | 4.48 | 1.29 | strongly important |
| 3 | Electronic Banking infrastructures | 4.39 | 1.12 | strongly important |
| 4 | Entrepreneurship culture | 4.33 | 0.96 | strongly important |
| 5 | Perceived risk from new technologies by SMEs | 4.23 | 0.87 | strongly important |
| 6 | Update and transparent information | 4.19 | 1.61 | important |
| 7 | Private sector enthusiasm | 4.17 | 1.53 | important |
| 8 | Managerial skills | 4.13 | 1.23 | important |
| 9 | Confidence to government | 4.07 | 0.97 | important |
| 10 | Preferring immediate benefits instead of late benefits | 4.01 | 0.79 | important |
| 11 | Governmental investment in informatics systems | 3.92 | 1.14 | important |
| 12 | Comprehensive agricultural products information site | 3.89 | 1.33 | important |
| 13 | Private limits safeguarding | 3.82 | 1.17 | important |
| 14 | To be exemption and special facilitates | 3.69 | 1.26 | important |
| 15 | Internet speed and costs | 3.62 | 1.32 | important |
| 16 | International and regional organizations presence | 3.57 | 1.26 | important |

In round two, a questionnaire including 29 problems identified through the first round was distributed among 20 panelist and they were asked to rate the problems on a five-point Likert-type scale. They were also asked to make changes in the items to better clarify the problems, if necessary. After this round, 16 problems were ranked as “important and strongly important” by panelists. We used mean rank and standard deviation to rank the problems. The result is displayed in table 4.

In this way, panelists named 49 problems as “important and strongly important” out of 72 cases (48 cases based on prior research and 24 ones based on panelists experience and knowledge). In round three, we re-distributed the questionnaire among respondents.

The questionnaire included 49 problems all been determined and their degree of importance identified by panelists. The result of third round is displayed in table 5. As shown in the table, in third round, panelists have named 46 problems as “important and strongly important” in implementing EC in horticultural products.

Table5: Delphi study round Three: ranked problems based on the level of importance (n=19)

| | Problem | rank | M |
|----|---|------|------|
| 1 | E-government growth(E-banking, E-transactions, E-insurance, E-customs) | 1 | 4.77 |
| 2 | Telecommunication infrastructures | 2 | 4.74 |
| 3 | Quantity and quality of advertising | 3 | 4.72 |
| 4 | Perceived opportunities | 4 | 4.69 |
| 5 | Managerial skills | 5 | 4.68 |
| 6 | Political pressures on economy | 6 | 4.65 |
| 7 | Economic stability | 7 | 4.64 |
| 8 | Electronic Banking infrastructures | 8 | 4.61 |
| 9 | Unity of directing | 9 | 4.59 |
| 10 | Entrepreneurship culture | 10 | 4.57 |
| 11 | Resistance to change | 11 | 4.56 |
| 12 | Users English language literacy | 12 | 4.52 |
| 13 | Top management support | 13 | 4.47 |
| 14 | Transparency in policy and strategies | 14 | 4.44 |
| 15 | IT skillful operators | 15 | 4.41 |
| 16 | Cultural aspects of organization | 16 | 4.39 |
| 17 | Using traditional management patterns | 17 | 4.37 |
| 18 | Facilitator and clear regulations | 18 | 4.37 |
| 19 | Private sector enthusiasm | 19 | 4.32 |
| 20 | Perceived Transactions risks | 20 | 4.29 |
| 21 | National willpower | 21 | 4.27 |
| 22 | Standards for documentation | 22 | 4.23 |
| 23 | process of solving legal disagreements | 23 | 4.20 |
| 24 | Perceived risk from new technologies by SMEs | 24 | 4.19 |
| 25 | Experienced and accessible consultants | 25 | 4.17 |
| 26 | Confidence rate to accept the EC as a change | 26 | 4.14 |
| 27 | Comprehensive national information network | 27 | 4.13 |
| 28 | Competitive commercial economy | 28 | 4.11 |
| 29 | Preferring immediate benefits instead of late benefits | 29 | 4.08 |
| 30 | Government domination on economy | 30 | 4.07 |
| 31 | Country membership in WTO | 31 | 4.03 |
| 32 | Internet and PC penetration rate | 32 | 4.03 |
| 33 | Postal system | 33 | 3.99 |
| 34 | Comprehensive agricultural services information | 34 | 3.94 |
| 35 | Update and transparent information | 35 | 3.92 |

| | Problem | rank | M |
|----|--|------|------|
| 36 | Computer literacy among enterprises | 36 | 3.90 |
| 37 | Computer literacy among customers | 37 | 3.86 |
| 38 | Software support to IT and ICT | 38 | 3.77 |
| 39 | International and regional organizations presence | 39 | 3.76 |
| 40 | Neglecting R&D | 40 | 3.68 |
| 41 | Awareness about Internet implications | 41 | 3.62 |
| 42 | Agricultural markets map | 42 | 3.58 |
| 43 | Comprehensive agricultural products information site | 43 | 3.56 |
| 44 | Internet speed and costs | 44 | 3.56 |
| 45 | Governmental investment in informatics systems | 45 | 3.54 |
| 46 | To be exemption and special facilitates | 46 | 3.53 |
| 47 | Private limits safeguarding | 47 | 3.48 |
| 48 | Confidence to government | 48 | 3.45 |
| 49 | Band width | 49 | 3.43 |

In round Four, the questionnaire was re-distributed and rechecked among respondents. The final list of ranked problems is indicated in table 6.

Table6: Delphi study round Four: final list of ranked problems (n=19)

| | Problem | rank | M |
|----|--|------|------|
| 1 | E-government growth(E-banking, E-transactions, E- insurance, E- customs) | 1 | 4.78 |
| 2 | Telecommunication infrastructures | 2 | 4.75 |
| 3 | Quantity and quality of advertising | 3 | 4.71 |
| 4 | Perceived opportunities | 4 | 4.69 |
| 5 | Managerial skills | 5 | 4.65 |
| 6 | Political pressures on economy | 6 | 4.62 |
| 7 | Economic stability | 7 | 4.58 |
| 8 | Electronic Banking infrastructures | 8 | 4.58 |
| 9 | Unity of directing | 9 | 4.58 |
| 10 | Entrepreneurship culture | 10 | 4.57 |
| 11 | Resistance to change | 11 | 4.55 |
| 12 | Users English language literacy | 12 | 4.49 |
| 13 | Top management support | 13 | 4.44 |
| 14 | Transparency in policy and strategies | 14 | 4.44 |
| 15 | IT skillful operators | 15 | 4.42 |
| 16 | Cultural aspects of organization | 16 | 4.41 |
| 17 | Using traditional management patterns | 17 | 4.36 |
| 18 | Facilitator and clear regulations | 18 | 4.35 |
| 19 | Private sector enthusiasm | 19 | 4.34 |
| 20 | Perceived Transactions risks | 20 | 4.31 |
| 21 | National willpower | 21 | 4.25 |
| 22 | Standards for documentation | 22 | 4.24 |
| 23 | process of solving legal disagreements | 23 | 4.24 |
| 24 | Perceived risk from new technologies by SMEs | 24 | 4.20 |
| 25 | Experienced and accessible consultants | 25 | 4.14 |
| 26 | Confidence rate to accept the EC as a change | 26 | 4.14 |
| 27 | Comprehensive national information network | 27 | 4.13 |
| 28 | Competitive commercial economy | 28 | 4.12 |
| 29 | Preferring immediate benefits instead of late benefits | 29 | 4.10 |
| 30 | Government domination on economy | 30 | 4.08 |
| 31 | Country membership in WTO | 31 | 4.05 |

| | Problem | rank | M |
|----|--|------|------|
| 32 | Internet and PC penetration rate | 32 | 4.02 |
| 33 | Postal system | 33 | 3.99 |
| 34 | Comprehensive agricultural services information | 34 | 3.98 |
| 35 | Update and transparent information | 35 | 3.90 |
| 36 | Computer literacy among enterprises | 36 | 3.90 |
| 37 | Computer literacy among customers | 37 | 3.89 |
| 38 | Software support to IT and ICT | 38 | 3.81 |
| 39 | International and regional organizations presence | 39 | 3.78 |
| 40 | Neglecting R&D | 40 | 3.69 |
| 41 | Awareness about Internet implications | 41 | 3.68 |
| 42 | Agricultural markets map | 42 | 3.63 |
| 43 | Comprehensive agricultural products information site | 43 | 3.62 |
| 44 | Internet speed and costs | 44 | 3.58 |
| 45 | Governmental investment in informatics systems | 45 | 3.56 |
| 46 | To be exemption and special facilitates | 46 | 3.57 |

The result of four rounds of Delphi study showed that we could end the rounding because of the following:

- a. More than 50% of the respondents have chosen the first 19 problems identified by the panelists as their first 19 choice.
- b. Standard Deviation of the responses for the importance of each impediment has reduced from 0.97 to 0.61 in two first rounds.
- c. The Kendal coefficient of responses in fourth round was 0.53 which is statistically significant.
- d. The Kendal coefficient for the order of problems in fourth round has only increased to 0.37 which is not a significant increase.

CONCLUSION

As indicated in table 6, the major problems identified by the Delphi method in the successful EC implementation in horticultural products were: weakness and deficiency in E-government growth(E-banking, E-transactions, E-insurance, E-customs), telecommunication infrastructures, quantity and quality of advertising, perceived opportunities, managerial skills, political pressures on economy, economic stability, E-banking infrastructures, unity of directing, entrepreneurship culture and resistance to change.

IMPLICATIONS AND RECOMMENDATIONS

For programming and developing the use of horticultural products in Iran, the essential requirement is the identification of the most

important problems. Without this, every type of action will be failed and it will cause the waste of financial resources. On the other hand, government, enterprises and customers won't have the required motivation to enter into the EC.

Regarding the most principal identified problem which is the poor designed infrastructures and poor performing of e-government, it is necessary to pay attention to activities like increasing e-readiness, developing informatics society, providing the essential infrastructures for e-custom, e-insurance and e-banking, performing commercial information bank, reengineering of transactions, designing agricultural market maps, facilitating export and import rules, providing the essential software, designing rules related to EC, benefiting from the experience of other enterprises and countries, observing the rule of copy right, developing e-marketing system, positive orienting to digital economy, developing multi-national enterprises, competitiveness of commercial conditions and developing entrepreneurial culture.

Regarding the second problem which refers to telecommunication infrastructures, it is necessary to consider activities like: increasing the speed and band width, increasing computer knowledge, the fair distribution of satellite and internet network, decreasing the cost of internet access, establishing e-signature, transaction security insurance, clarifying ISPs regulations and developing credit cards uses.

Regarding the problem related to advertising, it is necessary to consider activities like: EC regional and international conferences and

festivals performing, mass media propaganda, free consultative services, new emerged occupations related to EC, introducing competitive advantages and benefits of EC, truth fullness in EC, developing advertising brochures and educational workshops.

There are some activities which should be considered for suitable grounding EC: Introducing opportunities and potential risks in EC, enhancing team working spirit and organization cultural aspect enforcement for facing changing circumstances.

Based on the other introduced problems there are some recommendations for improving managerial skills as follow: introducing EC as a requirement to managers, top management support, using innovative process incentives, organizing syndicates and unions, decreasing government domination, nongovernmental sector enforcement, decreasing uncertainty conditions, policy makers real orientation to the development of EC, providing the requirements for foreign investments, active participation in regional and international organizations, establishing decentralization policies, providing a supportive fund for EC researches, developing SMEs related to EC, and modification of managerial perceptions and attitudes to EC.

And finally, providing related educational fields, adjusting the national standards with international ones, investment insurance, designing buy and sell culture modification programs, establishing E-transactions documentation system, sustaining the country's economic, politic and legal atmosphere, clarification of E-transaction in taxes rules and increasing Basic English language skills.

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