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**The role of agility and knowledge sharing on competitive advantage:  
An empirical investigation in manufacturing companies in Jordan**

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## **Abstract**

*This study aims to empirically explore the role of agility and knowledge sharing on the competitive advantage. The study proposes that nurturing effective knowledge sharing and agility may contribute to shaping the competitive advantage. It suggests that flexible organizations that focus on knowledge sharing and agility can increase their organizational performance. A survey is developed considering the mutual relationships between agility and knowledge sharing as competitive priorities that enable organizations to respond effectively to changing circumstances related to business environment. Insights for enrich prior theory of agility capabilities, knowledge sharing, and competitive advantage will be drawn based on extensive statistical analysis. The personal motivation for conducting this study is the fact that this work has never been done in Jordanian business environment, in addition, it is an empirical work where important findings will be emerged and as a result, relevant recommendations will be considered, however, it is expected that this study will contribute to the knowledge on both academic and practical levels.*

## **1. Introduction**

The problem of modern organizations is how to handle unpredictable, dynamism, dynamic, hostile, and ever changing business environment. In the last 10 years, firm abilities to respond reactively, proactively, and innovatively are a common concern for scholars and practitioners. Therefore, several methodologies, frameworks, and techniques are suggested to cope with environmental uncertainty. Different concepts and terms were used in the literature interchangeably referring to organization agility, for example, "Flexibility", "agility" responsiveness, "adaptability" etc. However, some scholar made clear distinguish between these terms and concepts while others use them synonymously. The fact that all related concepts and terms to organizations agility concentrate on organization abilities to adapt its processes, strategies, productions lines, resources, and so on to respond to the new circumstances that created by change. This, conveyed clear notion that there is no widely accepted definition for organization agility. The reason for lack of accepted definition might be attributed to irrelevant, imprecise, vague, surrogate, fuzzy logic, linguistic expression, and operational measures (Giachetti et al. 2003; Arteta and Giachetti, 2004; Lin et al. 2006a; Jain et al. 2007).

It is useful, if not critical to review the main literature in organization agility and related concepts / terms. The prominent scholar Sharifi and Zhang 1999; Zhang and Sharifi, 2000 developed a methodology for achieving agility in manufacturing companies. Goldman et al. (1995) proposed four strategic dimension of agility: (1) enriching the customer; (2) cooperating to enhance competitiveness; (3) organizing to master changes; (4) leveraging the impact of people and information. Enriching customers refers to delivering value and solutions to the customers rather than products. Internal and external cooperation is necessary to allocate resources effectively and efficiently. Therefore, products will be delivered to market in a cost effective and efficient manner. Organizing to master change means how flexible organization structure that permit relocation all organization resources. Jackson and Johansson (2003) state that, agility is not a specific goal organizations have to attempt to achieve rather is a necessity to maintain competitiveness in unpredictable, dynamic, and continuous changing business environment. Agility is established on various capabilities related to three main enterprise dimensions: manufacturing,

product, and market dimensions. Jackson and Jackson (2003) divide agility capabilities into four main dimensions: (1) product-related change capabilities, (2) change competency within operations, (3) internal and external co-operation, and (4) people, knowledge, and creativity.

Yusuf et al. (1999) identified competitive foundations of agility as follows: speed, flexibility, innovation, proactivity, quality, and profitability. They proposed that competitive foundations are primary features of agile manufacturing that must be accomplished at the same time. In their framework, they differentiate three types of agility that could be related to specific levels of organization. Elementary agility pertains to individual resources (people, machinery, and management); micro-agility refers to the enterprise, and macro-agility represents the inter-enterprise level. Zhang and Sharifi, 1999; Sharifi and Zhang (2000) propose the most comprehensive framework which identifies four important characteristics of manufacturing agility: (1) agility drivers, (2) strategic abilities, (3) agility providers, and (4) agility capabilities.

The paper is organized as follows: Section 1 introduction; in the subsequent section research objectives, section 3 demonstrates the research model. Section 3 presents agility literature review. Section 4 shows knowledge sharing literature review. Section 5 displays the research model. Section 6 explains research method. Finally, section 7 demonstrates research results.

This paper is organized as follows: following the introduction in section 1, in the subsequent section 2 presents research objectives. Section 3 reviewed agility capabilities literature. Section 4 reviewed knowledge sharing literature. Section 5 develops research model that used to draw the hypotheses of the research. Section 6 explains research method for collecting data. Section 7 analyzes data and testing hypotheses. Section 8 demonstrates the contributions of this research. Finally, section 9 provides the limitations and future insight

## **2. Research Objectives**

The main objectives of this research are answering the following questions:

1. To what extent are Jordanian manufacturing companies utilise agility capabilities to cope with environmental uncertainty?
2. To what extent are Jordanian manufacturing companies use knowledge sharing practices to cope with environmental uncertainty?
3. To what extent are manufacturing companies which utilised agility capabilities able to create and maintain their competitive advantage?
4. To what extent are manufacturing companies which used knowledge sharing able to create and maintain their competitive advantage?

## **3. Agility Literature Review**

In today's business environment, change is the only certain circumstance. New competitors, new potential customers, and harsh global competitions alter or nearly modify most industries in unexpected manner. To prosper, organisations should use the turbulence environment as an opportunity rather than a threat, organizations need to adapt quickly to new conditions. Turbulent environment is mainly the motivator of

agility. Organizations agility is perceived as a strategic weapon in coping with unpredictable, hostile, and ever-changing business environment. Several frameworks and methodologies were appeared in the related literature. For example, Zhang and Sharifi (1999, 2000) have developed a methodology for achieving agility in manufacturing organisations. The methodology divides the capabilities into four major categories namely: *responsiveness*; *competency*; *flexibility*; and *speed*. Recently, Lin et al. (2006) comply to the categorization of Zhang and Sharifi (1999, 2000) in which they consider the same named capabilities are very important for dealing or coping with uncertainty and changes in business environment. These capabilities are described below:

1. Responsiveness, which is the ability to identify changes and respond to them quickly, reactively or proactively, and also to recover from them;
2. Competency, which is the ability to efficiently and effectively realize enterprise objectives. In other words competency is an extensive list of abilities that provide a company with productivity, efficiency, and effectiveness in achieving its aims and goals. Example on these abilities include: strategic vision, sufficient technological capability, cost-effectiveness;
3. Flexibility/adaptability, which is the ability to implement different processes and apply different facilities to achieve the same goals. It consists of items such as: product volume flexibility, people flexibility, etc; and
4. Quickness/speed, which is the ability to complete an activity as quickly as possible. Items include: quickness in new products time-to-market, quickness and timeliness in products and service delivery.

The reviewed theories and research encourage, Lin et al. (2006b) to summarize the agility drivers in five factors: (1) market volatility (2) intense competition (3) changes in customer requirements (4) accelerating technological change, and (5) changes in social factors. Similarly, Kara and Kayis (2004) referring to Chen and Everett (1991) argue that the environmental uncertainty is linked to two groups: environmental uncertainties with regard to marketing, and uncertainties with regard to the manufacturing process. They indicate that the both groups require manufacturing companies becoming flexible or agile.

Other researchers, Zain et al. (2005) investigated if the technology adoption has positive impact on organisational agility. The technology acceptance model proposed in this research hypothesized that attitude toward new technology systems impacts organisational agility through actual use information technology use. The attitude toward the new information technology systems is a function of perceived usefulness and ease of information technology use influenced the organisation agility through actual use and attitude toward technology. The results revealed that perceived usefulness and ease of use impacts organisation agility through actual information technology use and attitude toward technology.

Recently, Sherehiy et al. (2007) extend the prior literature in agile manufacturing and agile work force by showing the global characteristics that could be applied to all aspects of organization: flexibility, responsiveness, speed, culture of change, integration and low complexity, high quality, customized products, and mobilization of core competencies. They strongly call for further research in agile manufacturing and agile work force to validate the attributes and indices of agility. It could be concluded that from the above arguments, if an organisation has the agility

capabilities, it will be able to cope with environmental uncertainty effectively and efficiently. Therefore, it will realise and maintain its competitive advantage. Not only agility capabilities will improve organisation competitive advantage but also knowledge sharing is needed.

#### **4. Knowledge sharing literature review**

Knowledge sharing is a primary key to respond quickly and proactively for ever-changing business environment. It also enhances the chances for organisations to be less vulnerable to dramatic changes in business environment. The literature is over-emphasized that knowledge sharing is the peninsula for many of organisations problems. Thus, knowledge sharing has been cited as a precondition of organisation competitiveness. It is assumed that knowledge sharing could help an organization to out-perform its direct competitors. Several definitions have appeared for knowledge sharing in the literature. For instance, Bartol and Srivastava (2002) define it as the action in which employees diffuse relevant information to others across organisation. According to Bock and Kim (2002) knowledge sharing is considered the cornerstone of knowledge management. Also, Inkpen (2000) places it: “unless individual knowledge is shared throughout an organisation, the knowledge will have a limited impact on organisational effect (p.124)”.

An extensive literature review of knowledge sharing shows that it is fragmented around three strains (Lin, 2007; Chiu et al. 2006): Theory: several theories have been used to explain how and why shared knowledge should be achieved within organisations (i.e. resources-based theory, transaction cost theory and social capital theory). Methodology: multi-methods and tools used to facilitate knowledge sharing (i.e. system planning, system reengineering, and communication systems). Sharing: sharing within an organisation (inter-department, inter-organisation, inter-network, and inter-group). The proposed aim of knowledge sharing is to improve organisation competitiveness. Thus, organisations have to reward their employees to encourage them to share their knowledge. The reward systems may target individual or group of employees. Dong-Joo and Jae-Hyeon (2006) developed a model to link knowledge sharing and reward systems based on two types of reward systems: individual-based reward systems based on individual contribution of valuable knowledge and group-based reward system which is based on the whole group contribution in knowledge sharing that improves organisational performance. In a qualitative study in manufacturing companies in Taiwan (Hsu, 2006) suggests three organizational practices that enhance employees tendencies to share their knowledge: continuous company-wide learning initiative, performance management systems which motivate employee knowledge sharing, and information disclosure to create a sharing climate.

The knowledge sharing literature also shows that many contextual factors prevent nurturing of knowledge sharing within organisational boundaries. For instance, Lin (2007) shows that three elements: organisational structure characteristics, organisational culture, and organisational interaction are the motive power of knowledge sharing. Also, Yang (2007) proposes that leadership roles (i.e. facilitator, mentor, and innovator) and collaborative culture are strongly correlated with knowledge sharing. The factors that are hinders knowledge sharing is not limited to organisational context but employees tend to hoard their knowledge even when collaborative culture is being established and informal relationship existed. For

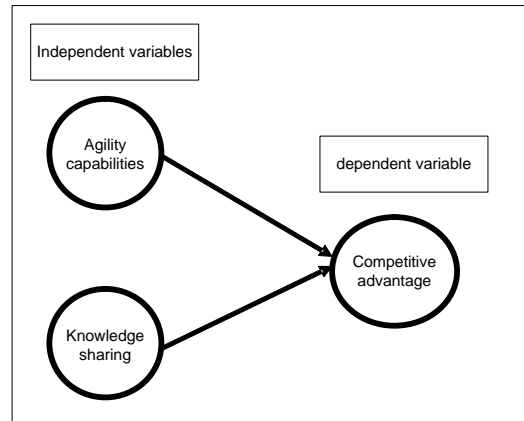
example, Garfield (2006) identified 10 reasons why people don't share their knowledge: They don't know why they should do it; they don't know how to do it; they don't know what they are supposed to do; they think the recommended way will not work; they think their way is better; they think something else is more important; there is no positive consequence to them for doing it; they think they are doing; they are rewarded for not doing it, and they are punished for doing it. Not only knowledge sharing is limited to traditional organisational setting but also it may include the virtual organisations and communities (Chiu et al. 2006). Empirically, Zahra et al. 2007 assumed that there should be formal and informal mechanisms for knowledge sharing.

In the same context, Hsu et al. 2007 described the knowledge sharing behavior in virtual communities. Their study demonstrates the role of trust, self-efficacy, and outcome expectations on the willingness of employees to share their knowledge. Their results indicated that self-efficacy has both direct and indirect effects on knowledge sharing behavior. Also, the personal outcome expectations have significant influence on knowledge sharing behavior. Finally, the findings suggested that economy-based trust and information-based trust has to be established prior developing identification-based trust to ensure overall mutual trust taking place. However, despite the bulk of literature in the last few years in knowledge management and knowledge sharing issues, the impacts of knowledge sharing on organisational issues are still vague. For example, Du et al. (2007) found a moderate relationship between knowledge sharing and organisational performance.

From the above discussion, it could be concluded that, knowledge sharing might play a critical role in improving organization competitiveness under business environmental uncertainty. Therefore, more theoretical and empirical explanations are needed to clarify the relationship between agility capabilities, knowledge sharing practices, and competitive advantage. Thus, it seems plausible that agility capabilities and knowledge sharing may be catalysts of a dynamic competitive advantage under dramatic accelerated technological and environmental changes.

## **5. Research Model**

Agility is widely believed to be the key contributor to improve organisation performance and competitive position. It has been considered the backbone for companies to be alive and prosper in dynamic, volatile, unpredictable, vague, ever changing business environment. Whereas, the primary key factor to respond on time, grasp, and convert risk of change into an opportunity depends on the flow of information cross-departments, cross-teams, vertically, and horizontally. Also, the information flow outside the organization boundaries (suppliers, customers, and even competitors). Building on the literature, this study assumes that if an organization needs to be alive and prosper in ever-changing business environment, has to nurture continuous knowledge sharing and establish clear agility capabilities. In this study, a research model is presented and tested empirically in the context of Jordanian manufacturing companies. Figure 1 depicts the model that includes three constructs, namely, agility capabilities, knowledge sharing, and competitive advantage.



*Fig 1. Research Model*

The model shows that higher level of agility capabilities and knowledge sharing would improve organisation competitive advantage under unpredictable, hostile, and ever-changing business environment. In other word, the agility capabilities and knowledge sharing seem to be the right strategic business practices under the aforementioned business conditions. Thus, the following hypothesis can be phrased as follows:

**H1:** Jordanian manufacturing companies utilized the agility capabilities to cope with uncertainty in business environment.

**H2:** Jordanian manufacturing companies which utilized the agility capabilities to cope with uncertain business environment are able to realize competitive advantage.

**H3:** Jordanian manufacturing companies practice knowledge sharing to cope with uncertainty in business environment.

**H4 :** Jordanian manufacturing companies which practice knowledge sharing are able to realize competitive advantage.

## **6. Research Method**

### **6.1 Data sources**

The data are collected through questionnaire survey of listed manufacturing companies in Jordan. The questionnaire targeted senior managers responsible for such area as Director, vice-president, operation manager, marketing manager, and plant manger. The decision was taken to collect information from senior informants as they posses' wider and deeper knowledge of multi-aspects of organisational issues. Whereas, junior informants are widely believed to have more focused knowledge related to limited issues.

Manufacturing companies were targeted by the survey, since the primary objective was to investigate the role of agility and knowledge sharing practices on organisations competitive advantage. Jordanian manufacturing companies that are classified as

public shareholding companies at Amman Stock Exchange Market were chosen as the sample for this research because the industrial sector is more relevant and is expected to be more interested in this research to overcome changing business environment. As the population of this research is small, this consists of 88 industrial companies that are classified at Amman Stock Exchange Market as industrial shareholding companies according to its report for the year 2004, all of which were targeted. The primary aim for choosing the entire population is to ensure that the sample is representative and biased-free.

The covering letter addressed to the executive officers or managing directors explained the objectives of the study and the confidentiality and anonymity the research has guaranteed. They were requested to forward the questionnaire to Director, vice-president, operation manager, marketing manager, and plant manager or other qualified employee who has the ability to provide the same quality of response. Five members of the faculty of business administration at Al Hussein Bin Talal University who hold PhD degrees had reviewed the questionnaire. The aim was to reduce misunderstanding and irrelevant responses. The survey questions were revised in the light of the feedback that we have got from the reviewers. We took all the suggestions in our account and a new copy of the questionnaire reprinted and circulated to the targeted respondents.

## **6.2 Measurements development and pilot test**

The Operationalisation of constructs and their aspects were developed in accordance with the accepted guidelines of reliability and validity for multiple-item measure (Churchill, 1979). Intensive literature review was conducted for the research constructs, and item-based measurements were developed. Measures tested in prior studies were adopted with changes in wording to suit manufacturing context. Several approaches to measure agility can be found in organisation agility and agile manufacturing literature. For example, agility index widely used by several authors (Tsourveloudis and Valavanis, 2002; Yusuf and Adeleye, 2002). The agility index refers to a set of capabilities intensity levels. Another method for measuring agility (Ren et al., 2000) based on analytical hierarchical process (AHP) methodology. Other researchers (Giachetti et al., 2003; Arteta and Giachetti, 2004; Jain et al., 2007; Lin et al., 2006a, 2006b; acknowledged that agility as a concept is imprecise, vague, and complex. Therefore, linguistic expression and Fuzzy logic are the suitable measure of agility.

The agility was defined in this study to include four capabilities: the responsiveness capability was measured by 9 items that measure the extent to which manufacturing companies have the abilities to respond reactively and proactively to changes in business environment on timely basis. For measuring agility capabilities, capabilities were divided into four groups namely: responsiveness, competency, flexibility, and quickness. The measurement scales and items were adapted from the previous studies: Becker and Knudsen (2005); Zhang and Sharifi (2000); Sharifi and Zhang (1999) for measuring *responsiveness, competency and quickness*; 4 item were used to measure responsiveness; 6 items were used to measure competency. As flexibility is a multidimensional concept, Gupta and Somers, 1996; Zhang et al. 2002 divided flexibility into five dimensions namely: volume flexibility, mix flexibility, labour flexibility, expansion flexibility, and delivery flexibility. These dimensions

according to Pagell and Krause (2004) are dominance in the manufacturing strategy literature to address the competitive priority of flexibility. In order to measure flexibility, 16 items were adopted from aforementioned studies.

The measures for knowledge sharing practice were adopted from (Zahra et al., 2007). They include 10 items to capture respondent perceptions of knowledge sharing practice, 5 concerned to measure the extent to which organisation used formal channels or approaches to share knowledge within and outside organisation boundaries. Whereas, the other 5 used to measure the extent to which organisation used informal channels to share knowledge. With regard to organisation competitive advantage, the measures were adopted from (Li et al., 2006). They include 5 items to measure respondent perceptions of organisation competitive position relative to the main competitors.

The main survey consisted of 264 questionnaires. Each manufacturing company was given 3 questionnaires to be delivered to the Director, Vice-president, production manager, and operations manager. The survey resulted in a sample of 114 usable responses from the manufacturing companies. Out of 114 completed questionnaires only 2 were unusable for a lot of missing data. These usable questionnaires represent a response rate equal to 42% which is over than the accepted standard (20%) in this type of research. Table (1) shows the number and percentage of respondents.

Table 1: Types, number, and percentage of respondents.

<b>Respondent</b>	<b>Number</b>	<b>Percentage</b>
<b>Director</b>	24	21%
<b>Vice-President</b>	31	28%
<b>Production Manager</b>	27	24%
<b>Operations Manager</b>	30	27%
<b>Total</b>	112	100%

## 7. Data Analysis and hypothesis testing

Cronbach's alpha was carried out to measure the internal consistency of the research constructs. The lowest recommended acceptable "alpha" should be over than .70 for this type of study. Table (2) demonstrates the results of reliability test (alpha) for all the research constructs. The shows that "alpha" for all the research constructs are over than the recommended one.

Table 2: values of Cronbach's alpha of the research constructs.

<b>Construct</b>	<b><math>\alpha</math>- value</b>
<b>Responsiveness</b>	78%
<b>Competency</b>	81%
<b>Quickness</b>	76%
<b>Flexibility</b>	74%
<b>Knowledge Sharing(Formal Channel)</b>	84%
<b>Knowledge Sharing(Informal Channel)</b>	71%
<b>Competitive Advantage</b>	85%

One-sample T-test was carried out to determine the similarity between the mean of the sample and the mean of the population of which the sample was drawn. The population mean is unknown. Based on 5 Point likert scale that has been used in the

questionnaire which, its average equal to 3, a hypothesis can be formulated in mathematical expression as follows.

H0:  $\mu = 3$

H1:  $\mu > 3$

Using a 95% confidence interval of difference, the results presented in table 3 shows that there is no significant differences between the sample mean and the population mean for all the study constructs. Therefore, the above hypothesis has to be accepted. Thus, the sample mean is similar to the population mean.

Table 3: the results of one-sample T-test

<b>Variable</b>	<b>T</b>	<b>df</b>	<b>95% Sig.(2-tailed)</b>	<b>Mean Difference</b>
<b>Responsiveness</b>	14.05	111	.00	.782
<b>Competency</b>	7.6	111	.00	.563
<b>Quickness</b>	6.06	111	.00	.387
<b>Flexibility</b>	14.7	111	.00	.681
<b>Knowledge Sharing</b>	18.9	111	.00	.784
<b>Competitive Advantage</b>	22.6	111	.00	.816

### 7.1 Descriptive statistics

The descriptive statistics were used to test the extent to which manufacturing companies are using agility capabilities and knowledge sharing to cope with environmental uncertainty. Table 4 shows that all the agility capabilities and knowledge sharing elements are over than 3. Thus, the respondents perceived their companies widely used agility capabilities and knowledge sharing to deal with dynamic, volatile, and ever-changing business environment.

Table 4: Respondents perception of agility capabilities and knowledge sharing

<b>Variable</b>	<b>Scale Average</b>
<b>Responsiveness</b>	4.01
<b>Competency</b>	3.80
<b>Quickness</b>	4.67
<b>Flexibility</b>	4.20
<b>Knowledge sharing</b>	4.78

The above results confirmed prior research claims (Sharifi & Zhang, 1999 ; Vazquez-Bustelo & Avella, 2006) who suggested that agile manufacturing capabilities has to replace the traditional systems to deal with new business conditions. More paradigms and tools are needed to deal with business environment. Knowledge sharing one of these tools that should be used by firms in different sectors. It can be seen from Table 4, Knowledge sharing has been nurtured and practiced by Jordanian manufacturing companies. This result supports (Law & Ngai, 2007) who suggested that firm performance is a function of knowledge sharing and learning behavior. Also, their results confirm that knowledge sharing influences business process improvements and product – service offering.

### 7.2 Multiple Regression

Multiple regression analysis was carried out to test the relationships between the research constructs. It shows how much of the variance in the dependent variable

can be explained by independent variable/ variables. Therefore, it looks like the multiple regression is the most suitable method to test research hypotheses. Table 5 shows the relationship between agility capabilities and competitive advantage. To be sure there is no multicollinearity between independent and dependent variable, multicollinearity (Tolerance and Variance Inflation Factor (VIF)) test was carried out. Tolerance is the amount of variance in dependent variables that is not explained by independent variables. The minimum value of tolerance must be less than .10 to indicate a problem of multicollinearity. VIF usually used to measure how the multicollinearity can inflate the variance of regression coefficient. When the value of VIF comes closer to 1, it signals there is an interaction between independent variables. The minimum acceptable value for VIF should not be less than .5 any value higher than that would indicate there is problem with multicollinearity.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.81	.62	.617	.2712

The result in Table 5 is similar to the findings of (Ren et al.2003) that revealed that such competitive bases as Speed, Proactivity, and Flexibility had the largest influence on firm competitiveness. The result also, consistent with the work conducted by Yusuf & Adeleye (2000). In which, they found agile capabilities such as speed to market and dependability were significantly correlated with all performance measure(Sales turnover, Market share, Turnover, and customer loyalty). Their study revealed that agile companies outperformed lean companies in all performance measures.

Our finding in Table 6 shows that knowledge sharing explained .43 percent of the variance in firm's competitive advantage. Therefore, it indicates that knowledge sharing has a significant influence on firm competitive advantage. This result is according to the argument of Zahra et al.(2007) where much more attention should be given to knowledge sharing and technological capabilities for firms to maintain market share, sales growth, and create wealth.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.61	.43	.372	.3211

With regard to the relationship between the two independent variables ( agility capabilities and Knowledge sharing) and dependent variable (competitive advantage), can be seen in Table 7. The strength of the relationship between these variables is represented by R Square. The R Square indicates that 72% of the total variance in dependent variable competitive advantage can be attributed to the independent variables(responsiveness, competency, quickness, flexibility, and knowledge sharing). This finding extends the idea that agility capabilities are critical factors to create and maintain competitive advantage under highly dramatic business changes. It also, provides a meaningful insight by showing knowledge sharing has a significant impacts on competitive advantage.

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.85	.72	.718	.5911

To summarize, regarding the statistical data showed in 4, 5, 6, and 7 the decision was made to accept all the hypothesized relationships between agility capabilities, shared knowledge, and competitive advantage. Table 8 shows a summary of the research hypotheses and the related decision.

Table 8: Summary of research hypotheses and Decision

Hypotheses	Description	Decision
H1	Jordanian manufacturing companies utilized the agility capabilities to cope with uncertainty in business environment.	Accepted
H2	Jordanian manufacturing companies which utilized the agility capabilities to cope with uncertainty in business environment are able to realize competitive advantage.	Accepted
H3	Jordanian manufacturing companies practice knowledge sharing to cope with uncertainty in business environment.	Accepted
H4	Jordanian manufacturing companies which practice knowledge sharing are able to realize competitive advantage.	Accepted

### 8. Contributions of this research

As this study is an exploratory in nature, it represents the first attempt to relate agility capabilities, knowledge sharing, and competitive advantage. It also extends the precedent literature by confirming that if the organisations need to realise a competitive advantage under uncertain, unpredictable, volatile, dynamic, and ever-changing business environment have to give more attention and focus on nurturing agility capabilities and knowledge sharing practices. The study will enrich knowledge sharing literature and shed light on the importance of knowledge sharing as a strategic weapon to cope with uncertainty in business environment. In addition, it is expected to motivate researcher and Practitioners to aware the importance of both agility capabilities and knowledge sharing to cope with the new business circumstances. Finally, the critical role of knowledge sharing to cope with aforementioned business conditions will entice managers to nurture knowledge sharing culture within organisational boundaries.

### 9. Limitations and future insights

Although this study has been operationalized its constructs according to the prior studies (Sharifi and Zhang 1999; Zhang and Sharifi 2000; Becker and Knudsen 2005; Gupta and Somers, 1996; Zhang et al. 2002; Li et al., 2006; Zahra et al., 2007) to maintain reliability and validity. It seems to be not free from limitation. First, perceptual data that was collected from respondents is more likely to be subject to method bias. Although the research model explains high level of variance in the independent variables, it seemed quite simple because it has only two independent variables. But, this is not severe problem that threatens the results. However, it represents an opportunity for future research to include more independent variables to construct a more comprehensive framework. This study was designed and tested in a cross-sectional data of inputs from manufacturing companies; it would be adequate to apply the same constructs in other business setting such as service companies. It would be important to note that future research could investigate that

to what extent manufacturing companies will be able to sustain their agility capabilities and knowledge sharing under ever-changing business environment circumstances. Longitudinal data would be suitable to verify the claims of this study. Nevertheless, the study has provided empirical evidence to confirm the hypothesized relationships between agility capabilities, knowledge sharing, and competitive advantage.

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**Al Hussein Bin Talal University**  
**Faculty of Business Administration and Economics**

**The role of agility and knowledge sharing on competitive advantage:  
An empirical investigation in manufacturing companies in Jordan.**

**Questionnaire Survey**

**Dear Participant:**

We are currently undertaking a research project investigating the role of agility and knowledge sharing on competitive advantage. Your response is extremely important to the success of this study. We would like to assure you that your response will be treated as "**Strictly Confidential**". Your response will be used for academic purposes only. Please answer the questionnaire from the perspective of your job title that most clearly defines your job responsibilities (e.g. Director, Vice-President, Operation Manager, Marketing Manager, Plant Manager, etc). Also, please note that we have written these questions to be applicable to many types of manufacturing companies and may not all exactly apply to your situation. Nevertheless, please attempt to answer all questions. However, if you are unsure about response, or think it would be misleading, please leave the specific question unanswered.

**Thank you in advanced for your help and cooperation**

Dr. Soud Almahamid

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## **PART 1: GENERAL Background**

**Please tell us about yourself and your company background:**

**Company name:**

**Department name:**

**Your job title:**

**Years of experience in this job:**

**Years of working with this organisation:**

**Years of experience in this field:**

## **PART 2: Agility Capabilities**

### **Section A: Using agility in coping with uncertainty**

This section is concerned with investigating the ability of manufacturing companies in Jordan to use the agile capabilities ( responsiveness, competency, flexibility, quickness). Please insert an **X** in the appropriate column. The options range from 1 (strongly disagree), 2(disagree), 3( neither disagree nor agree), 4 (agree), and 5 (strongly agree).

<b>Responsiveness</b>		<i>Strongly Disagree</i>			<i>Strongly Agree</i>	
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>Q1</b>	Our company makes quick decisions on reaction to price change.					
<b>Q2</b>	Our company has the tendency to perceive changes in customer needs.					
<b>Q3</b>	Our company periodically reviews the product development.					
<b>Q4</b>	Our company usually makes regular interdepartmental meetings on reaction to external changes.					
<b>Q5</b>	Our company responds quickly to competitors' campaigns.					
<b>Q6</b>	Interdepartmental activities are well coordinated in our company.					
<b>Q7</b>	Customer compliments are perceived in our company.					
<b>Q8</b>	Our company manages to implement plans on time.					
<b>Q9</b>	Involved departments in our company coordinate product changes.					

<b>Competency</b>		<i>Strongly Disagree</i>			<i>Strongly Agree</i>	
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>Q10</b>	Our company has the ability in challenging and outperforming new entries to market.					
<b>Q11</b>	Our company has the ability in predicting the trend of product life cycle.					
<b>Q12</b>	Our company has the ability in maintaining its position among its direct competitors in local market in the current position.					
<b>Q13</b>	Our company has the ability in maintaining its position among its direct competitors in global market in the current position.					
<b>Q14</b>	Our company has the ability in predicting its market share considering the intensity of competition.					
<b>Q15</b>	Our company has a strategic basis for competition (competition on: price, product differentiation, time, quality).					

<b>quickness</b>		<i>Strongly Disagree</i>			<i>Strongly Agree</i>	
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>Q16</b>	Our company can quickly change the quantities for our products.					
<b>Q17</b>	Our company can changeover quickly from one product to another.					
<b>Q18</b>	Our company can launch new products into the market.					
<b>Q19</b>	Our company can quickly discover changes in customer preferences.					

<b>Flexibility</b>		<i>Strongly Disagree</i>			<i>Strongly Agree</i>	
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>Q20</b>	Our company has the ability to operate efficiently at different levels of output.					
<b>Q21</b>	Our company has the ability to effectively increase or decrease aggregate production in response to customers.					
<b>Q22</b>	Our company can easily change the production volume of a manufacturing process.					
<b>Q23</b>	Our company can maintain performance standards when producing a wide variety of products in our plants.					
<b>Q24</b>	Our company can produce different product types without major changeover.					
<b>Q25</b>	Our company can build different products in the same plants at the same time.					

<b>Q26</b>	Our company can produce, simultaneously or periodically, multiple products in an operating cycle.					
<b>Q27</b>	Our company can vary product combinations from one period to the next.					
<b>Q28</b>	Workers in our company can perform different types of operations effectively.					
<b>Q29</b>	Workers in our company can perform a broad range of manufacturing tasks effectively.					
<b>Q30</b>	Workers in our company can operate various types of machines.					
<b>Q31</b>	Workers in our company can be transferred easily between organisation units.					
<b>Q32</b>	Our company is able to increase the capacity (e.g. output per unit time) of a manufacturing systems when required.					
<b>Q33</b>	Our company is able to increase the capability (e.g. quality) of a manufacturing systems when required.					
<b>Q34</b>	Our company is able to change capacity of available facilities to meet fluctuations in demand.					
<b>Q35</b>	Our company has the ability to effectively respond to changes in planned delivery times.					

**Section B: knowledge sharing in coping with uncertainty**

“In this section, we are interested to know to what extent your company has used formal and informal channels (or approaches) to share your knowledge with your managers and employees about issues listed below over the past 3 years. Formal channels refer to official meetings, memos, and formal discussions. Informal channels refer to informal communications and meeting that occur on and off the job. Please insert an **X** in the appropriate column. The options range from 1 (Never), 2(Seldom), 3( Occasionally), 4 (Often), and 5 (Frequently).

<b>Knowledge sharing</b>						
<b>Q36</b>	How often do you use formal communication channels to share information with your employees about.....?	<i>Never</i> <i>Frequently</i>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>A</b>	Emerging technologies.					
<b>B</b>	Technological advancements in the industry.					
<b>C</b>	Changes in industry conditions.					
<b>D</b>	Changes in customer needs.					
<b>E</b>	Changes in the strategies and tactics of your competitors.					

Q37	How often do you use informal communication channels to share information with your employees about ...?	<i>Never</i> <span style="float: right;"><i>Frequently</i></span>				
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>A</b>	Emerging technologies.					
<b>B</b>	Technological advancements in the industry.					
<b>C</b>	Changes in industry conditions.					
<b>D</b>	Changes in customer needs.					
<b>E</b>	Changes in the strategies and tactics of your competitors.					

### Section C: Competitive Advantage

With regard to competitive advantage of your firm, Please insert an **X** in the appropriate column to indicate the extent to which you agree and disagree with each statement. Please insert an **X** in the appropriate column to indicate the extent to which you disagree and agree . The options range from 1 (strongly disagree), 2(disagree), 3( neither disagree nor agree), 4 (agree), and 5 (strongly agree).

Competitive advantage		<i>Strongly Disagree</i>			<i>Strongly Agree</i>	
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
<b>Q38</b>	Our company is capable of competing against major competitors based on low price.					
<b>Q39</b>	Our company is capable of offering product quality and performance that creates higher value for customers.					
<b>Q40</b>	Our company is capable of providing on time the type and volume of product required by customers.					
<b>Q41</b>	Our company is capable of introducing new products and features in the market place.					
<b>Q42</b>	Our company is capable of introducing new products faster than major competitors.					
<b>Q43</b>	Over all, our company outperform it's direct competitors.					